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User's Guide for a Computer Program for Calculating the Zero-Lift Wave Drag of Complex Aircraft Configurations

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SUMMARY

Supersonic zero-lift wave-drag computer program has been developed to extend the geometry ing capabilities of previous versions of the program. Highly accurate wave-drag analysis can now be performed because complex geometries can be represented accurately and do not have to be modified to meet the requirements of a restricted-input format.

INTRODUCTION

The ability to numerically define an aircraft concept for analysis or construction of wind-tunnel test models has progressed to the point that very complex and detailed numerical models can be generated easily and quickly with the aid of computer codes and interactive modeling techniques. Frequently, the same numerical model is used throughout the entire design process - from concept and analysis through manufacturing (fig. 1).

Many of the analysis computer codes in use today in research institutions and throughout the aircraft industry were developed in the 1960's and were written to accept as input simple numerical models, which compromised the analysis of the physical models (ref. 1). Often this tends to be restrictive when applied to advanced aircraft concepts currently being designed and evaluated.

Illustrated in figure 2(a) are some of the restrictions imposed on early numerical models. The fuselage and engine nacelles had to be represented by circular sections normal to the X-axis with no camber. Also, the wing could not be cambered. The fins and tails had to have symmetrical root and tip sections relative to the thickness distribution. This geometry description is used in reference 1.

Figure 2(b) illustrates some enhancements to the input geometry that were implemented (ref. 2). The fuselage could be described in either of two formats. One method was by giving the area of circular body sections parallel to the X-axis with the XZ-locations of the sections. The other method allowed the description of an arbitrary body by giving YZ-ordinates on the perimeter of cross sections through the body with their X-locations. Camber was added to the wings, and nonsymmetrical roots and tips were allowed for the fins and tails. The ability to handle more components was also added.

The increase in computer speed and central memory size has made possible the use of very detailed descriptions of a configuration (fig. 2(c)). The aircraft need no longer be described to the computer as wing, body, pods, fins, and canards, but as a collection of components. The fuselage, nacelles, and similar components can be described as general fusiform components. Corresponding points on fusiform component contours must be monotonic (either increasing or decreasing) in X because of the methods used in the analysis of these components, but the contours do not have to be parallel or perpendicular to the X-axis (fig. 3). The nonfusiform type components, such as wings, canards, and fins, can be described by nonintersecting contours in any direction rather than parallel contours as formerly required. It is no longer required that the aircraft be symmetrical about the XZ-plane, so axisymmetric configurations may be simulated.





Wave-drag analysis can now be performed on highly accurate representations of numerical models. The geometry does not have to be manipulated to meet the strict input requirements of the old versions of the program. This document is to serve as a guide for users of this more general version of a zero-lift wave-drag computer program.

PROGRAM DESCRIPTION

Program Availability

A computer program entitled "Computer Program for Calculating the Zero-Lift Wave Drag of Complex Aircraft Designs," which is described in this document, may be obtained at a nominal fee from:

Computer Software Management and Information Center (COSMIC) 112 Barrow Hall University of Georgia Athens, Georgia 30602 (404)542-3265

Request the program by the designation LAR-13223.

The material from COSMIC includes this document and the card image files of the program source code in Control Data Corporation MODIFY program library format (ref. 3), a sample control stream for compilation and execution of the program, a sample geometry input file, and a sample input file of conditions under which the input geometry is to be analyzed.

Area-Rule Concept

In 1952, Whitcomb proposed and experimentally verified his "area-rule" concept of transonic drag (ref. 4). In this concept, a given wing-body configuration is considered to be intercepted by a series of parallel cutting planes normal to the axis of the aircraft. The intercepted cross-section areas are considered as equivalent-area circles which define an equivalent body of revolution. The area-rule concept states that the equivalent-body wave d g is the same at Mach 1 as that of the complete configuration.

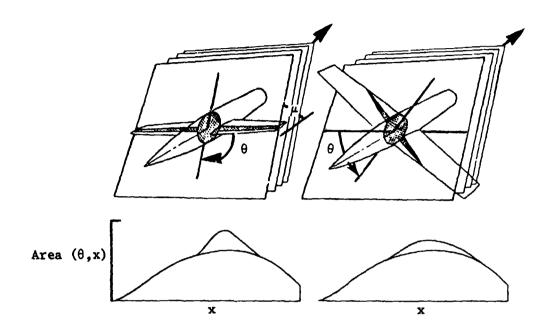
The problem becomes more complex for supersonic speeds. The general theory of Jones requires that the parallel cutting planes be tangent to the Mach cone and that the intercepted areas be projected onto a plane normal to the aircraft axis (ref. 5). There is no longer a single equivalent body, but a series of equivalent bodies — one for each of the many roll angles. A roll angle θ is the angle between a normal to a Mach plane projected onto the YZ-plane and the Y-axis. The integrated average of the equivalent-body wave drags through the full roll range of 360° is the wave drag





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of the complete configuration for a given Mach number. Two of the possible roll angles are illustrated in the following sketch:



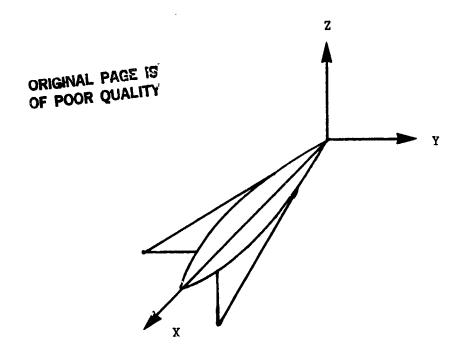
A digital computer program that applied the equivalent-body theoretical approach to the calculation of aircraft wave drag was developed in the 1960's by the Boeing Company and was subsequently adapted at NASA langley Research Center (ref. 1). The numerical description of a complex aircraft configuration was provided to the computer by systematic specification of fuselage and nacelle radii, along with wing- and tail-surface reference points, with the assumption of linear contours between successive ordinates. Once the aircraft description had been provided to the computer, the equivalent-body area distributions are determined by geometric solutions for the normal projection of areas intercepted by the cutting planes. The wave drag for the resulting equivalent bodies is then evaluated by the method of Eminton and Lord (ref. 6).

The current version of the program described in this report allows a general, arbitrary, numerical model as input to the program.

Computational Details

Data input and initialization. The program begins with the reading of the geometry input data. The configuration is usually positioned with its longitudinal

axis extending along the X-axis in the positive direction. The right-handed Cartesian coordinate system is used as illustrated in the following sketch:



The first data items read by the program are the vehicle identification, the reference area, and a print code. Next, a set of data is read describing general information about each component of the aircraft. This data set is identical in form for each component and contains the component number, the type of surface, a mirror image code, the number of contours to describe the component, and the number of coordinate points in each contour. Also included are a scale factor and the origin of the component in relation to the entire vehicle, so that a component can be described in a local coordinate system. Then, the x,y,z coordinate points are read for the component.

The program is currently dimensioned to have a maximum of 30 components containing a maximum of 50 contours with a maximum of 50 points per contour. However, this can be modified easily to handle more. The geometry input format is described in detail in a following section.

The next section of the program reads in the case data, which include the case identification, Mach number, angle of attack α in degrees, the $\kappa_r z_r$ coordinate for the angle-of-attack rotation, the number of equal intervals into which the X domain is divided, the number of equal intervals into which the domain of $\theta(-\pi/2,3\pi/2)$ is divided (must be a multiple of four), a code for the type of data to be read next, and a print code. A detailed explanation of the case information is given subsequently.



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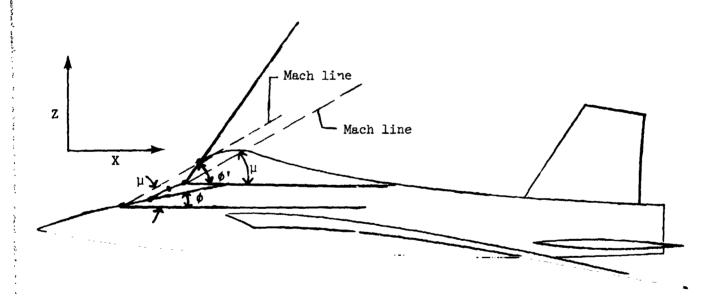
The entire set of geometry data is rotated in angle of attack $\,\alpha\,$ about the given rotation coordinate:

$$x^{*} = (x - x_{r}) \cos \alpha - (z - z_{r}) \sin \alpha + x_{r}$$

$$z' = (x - x_r) \sin \alpha + (z - z_r) \cos \alpha + z_r$$

The geometry data are then stored on a scratch file for further use.

Slope test. The next section of the program checks the slope of each fusiform-body line segment for a slope larger than the Mach angle. This test identifies violations of the slender body theory and can lead to erroneous results. The segments involved are printed, program execution continues, and an appropriate error message is printed at the completion of the case. Judgment must be exercised in deciding to accept the answers by considering the number and extent of the slope violations. The following sketch illustrates an acceptable body angle ϕ that is smaller than the Mach angle μ . The body angle ϕ in the aircraft windshield area exceeds the Mach angle and violates the theory.



Matrix inversion. To optimize computer time, the next step in the program is the inversion of the matrix used in the Eminton-Lord solution of the equivalent-body drags (ref. 6). If the same number of X-intervals is used for a large number of area distributions, the matrix need be inverted only once for the solution.

Determine X-intervals for values of θ . An interval of the X-axis outside of which no Mach plane of this θ -family will intersect any component of the aircraft is associated with each value of θ , and the interval is generally different for each value of θ (ref. 1). The next task is to determine the precise limits of this segment.



The equation of any of the Mach planes associated with the current value of $\,\theta\,$ is

$$x - (\beta \cos \theta)y - (\beta \sin \theta)z = X$$

where $\beta = \sqrt{M^2 - 1}$, M = Mach number, and X is the X-intercept of the particular plane.

The current Mach plane is forced through the end points of each given line segment, and X minimum (XA) and X maximum (XB) are selected for each component as well as the entire aircraft. The X minimum and X maximum found for each component at each value of θ are used to omit calculations of equivalent-body areas outside of these limits.

Determine intercepted areas, $S(\theta_i, x_j)$. The program selects a value of

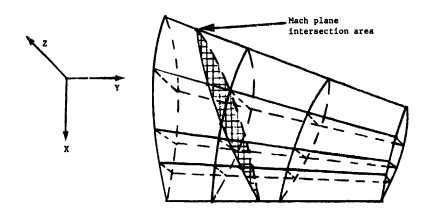
 θ , $-\pi/2$ plus some multiple n times $\Delta\theta$, n = 0, 1, 2, ..., $n\theta$ where θ varies from $-\pi/2$ to $3\pi/2$ and is divided into $N\theta$ equal subintervals. A flag is set within the program if the entire aircraft is symmetrical with respect to the XZ-plane, so that calculations only for values of θ between $-\pi/2$ and $\pi/2$ need be performed, as the results would be identical for the other half of the vehicle.

The interval between the previously selected X minimum (XA) and X maximum (XB) associated with the current value of θ is now divided into NX equal segments of length Δx , where $\Delta x = (XA - XB)/nX$. The successive values of x used are $x = XA + n \Delta x$, n = 0, 1, 2, ..., nX. For the current θ_i and x_j we have the Mach plane

$$x - (\beta \cos \theta_i)y - (\beta \sin \theta_i)z = x_j$$

The program then begins the task of finding the YZ-projection of the plane intersection with each component of the aircraft.

The fundamental tool is the calculation of the intersection, if one exists, of the current plane with each line segment determined from the contours used to describe the component as illustrated in the following sketch:





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The contour formed by the Mach plane intersection across the nonfusiform component elements is determined by matching the end points of the intercepted line segments. The method of computing the projected contour areas is that of summing determinants to find the area inside a closed polygon. If the closed curve is approximated by n points, (x_1,y_1) , (x_2,y_2) , ..., (x_n,y_n) , the area is as follows:

AREA =
$$1/2[(x_1y_2 + x_2y_3 + \dots + x_{n-1}y_n + x_ny_1)$$

- $(x_2y_1 + x_3y_2 + \dots + x_ny_{n-1} + x_1y_n)]$

Note that the first point is used twice to close the intersection contour.

The procedure for finding the projected intercepted areas for the fusiform components is a simple matter. Since the contours must be monotonic in X, the intersections on only the longitudinal lines need be determined, and these intersection points will be in the proper order to form a polygon.

An assumption is made that the cross section at the nose of a fusiform component continues on forward to negative infinity, and its cross section at the base continues on aft to infinity. This means that the most forward point of a longitudinal line is used in the polygon if the Macn plane is before it, and the most aft point is used if the Mach plane passes behind.

Computing wave drag. After the values of $S_{total}(\theta_i,x_i)$ for all the values of x_i are computed, the $D(\theta)/q$ associated with each θ is computed by the method of reference 6. The values of $D(\theta)/q$ thus obtained are used in the numerical integration

$$D/q = 1/(2\pi) \int_{-\pi/2}^{3\pi/2} D(\theta)/q d\theta$$

to yield the aircraft wave drag. The Newton-Cotes five-point formula is used to evaluate this integral (ref. 7).

Program Structure

Program WAVDRAG executes as a batch program with data input from a card image file. The general structure of the program is shown in figure 4. For clarity, this figure omits system utilities and library functions which are provided by the compiler or other system programs.

The following list is a summary of the function of each program element shown in figure 4:

I. WAVDRAG - Sets case default values, initializes some variables, provides
I/O buffers, and calls in other parts of the program as required. Does no data processing.



- A. CASPRNT Prints case input values.
- B. EMLORD Uses the technique of Eminton and Lord (ref. 6) to compute the wave drags of the equivalent bodies moving at supersonic speed in the direction of the longitudinal axis.
- C. MATINV Inverts a real square matrix A and optionally a lives one of more simultaneous systems of linear equations AX = B and finds the determinant of A.
- II. START Reads geometry data, scales and offsets the data, and stores it in a scratch file for further use.
- III. CASREAD Reads case data, sets various case parameters, and rotates geometry data by the angle of attack if indicated.
- IV. SLOPE Checks body slopes and sets an error flag if any body slope exceeds the Mach angle.
- V. XMAT Computes the matrix used in the Eminton and Lord wave-drag calculation technique, calls MATINV to compute its inverse, and stores on a scratch file the (NX-1) × (NX-1) matrix required for the drag computations for an initial value of NX.
- VI. ENDPTS Computes the end points (XA and XB) of the segment of the X-axis outside of which the total $S(X,\theta)$ is zero for each value of θ and also the end points (XAC and XBC) for all components at each value of θ .
- VII. ADIST Initializes conditions for computation of the equivalent body area distributions.
 - A. MIRIMG Formats a scratch file of the total vehicle area distribution $(-\pi/2 \le \theta \le 3\pi/2)$ from the area distribution $(-\pi/2 \le \theta \le \pi/2)$ of half of the vehicle when the entire aircraft is symmetrical about the XZ-plane.
 - B. SFUSI Calculates the area distribution of a fusiform body.
 - C. SLIFT Calculates the area distribution of a nonfusiform body.
 - D. LEVOUT Prevents a segment of intersection from being added to the collection of intersection segments.
 - E. CONECT Connects matching end points of projected intersection segments to form a polygon of the intersections of a Mach plane and a component.
 - F. REVERSE Reverses the order of the end points of an intersection segment.
 - G. MOVE Changes the position of an intersection segment in the array of segment is.





- H. OMIT Omits an intersection segment from the array.
- I. INLAP Finds the intersection of a line and a plane, where the line is defined by the coordinates (x,y,z) of two points through which it passes and the plane is defined by its coefficients (A,B,C,D) where Ax + By + Cz = D is its equation.

VIII. OUT - Prints the specified area distributions and computes and prints $D/Q(\theta)$ and D/Q(Total).

Table I lists alphabetically each program element with its size, the elements it calls, and the elements that call it.

Labeled COMMON

The following list contains the FORTRAN variables appearing in labeled COMMON. These are presented as an aid to program modification.

COMMON label	FORTRAN variable	Description
VEID	IDVIC (8)	Vehicle identification
	NETS	Number of components
	ICOMPA (2,31)	Two computer locations of identification for each component
	ISURFA (31)	A code for each component indica the type of surface: =0, fusiform surface \$\neq 0\$, nonfusiform surface
	IMAGEA (31)	A code for each component indicating the existence of a mirror image: =0, no mirror image ≠0, mirror image
	PEFA	Vehicle reference area
	IFLAG	<pre>=0, at least one component does not have a mirror image ≠0, all components have a mirror image</pre>
CASE	IDCAS	Ten characters of case identification
	хмасн	Mach number
	ALPHD	Angle of attack α , deg
	xo zo	Coordinate for α rotation





COMMON label	FORTRAN variable	Description
	ALPHA	Angle of attack α, rad
	NX	Number of X's
	NTHETA	Number of thetas θ
	NCON	=0, continue reading case cards 70, read new configuration geometry
	NPR	=0, output regular and debug printing =1, print all $S(X,\theta)$ =N, print every Nth $S(X,\theta)$
	INIT	=0, initial case information to be read
	ALPHSAV	Previous α value
	XSAV	Previous x _o value
	ZSAV	Previous z value
SLOPECK	LERR	<pre>=0, no error condition found in checking</pre>
ENDPNTS	XXA(49)	The XA for each theta at which the domain of $X(\theta)$ begins
	XXB(49)	The XB for each theta at which the domain of $X(\theta)$ ends
	XAC(49,30)	The $XA(\theta)$ for each component
	XBC(49,30)	The $XB(\theta)$ for each component

PROGRAM USE

Data Input

Two types of input data are required. The first type of data describes the actual geometry of the aircraft, and the second type is the Mach number and angle of attack of the aircraft at which drag is to be calculated. A single case consists of the wave-drag computation for a single configuration at a single Mach number and angle-of-attack orientation. All input data are to be in list-directed format (ref. 8).







Table II is a listing of a sample input emetry, and the actual configuration is illustrated in figure 5. Each component esscription is identical in form to that of the others. Each given section is thought of as a closed contour with no saddle points around a component. The program assumes that the last point given is connected to the first for all open contours, as the wave drag calculations are dependent on internal area. Consistency should be observed in the order in which contours are described, as the direction of surface normal vectors is important in other possible applications.

The case input data give the conditions to use in calculating the wave drag of the aircraft with the given geometry description. A sample input for analysis at Mach 1.414 and several angles of attack are given in table III. Usually one aircraft geometry is analyzed under several sets of conditions.

A detailed explanation of the input format as currently implemented follows:

I. Geometry input (on file TAPE5), in list-directed format:

Record	Variable name	Description
1	IDVIC	Vehicle identification (up to 80 characters)
2	REFA	Reference area
	IPR	=0, no optional printing ≠0, optional printing of scaled and offset coordinates
Repeat the f	following sets of da	ta fc each component (30 components maximu
3	IDCOMP	Component identification (up to

epeat t	he following sets of data	fc $^{\circ}$ each component (30 components maximum) -
3	IDCOMP	Component identification (up to 20 characters
	NCOMP	Component number (only used for additional identification)
	ISURF	<pre>=0, fusiform surface ≠0, nonfusiform surface</pre>
	IMAGE	=0, no mirror image ≠0, mirror image
	NPNT	Number of points, 50 maximum
	LINE	Number of lines, 50 maximum
	SCALE	=0 or 1., no scaling =Scale factor
	PO(1)	Component X-origin with respect to the vehicle X-axis



Record

Description
Component Y-origin with respect to the vehicle Y-axis
Component Z-origin with respect to the vehicle X-axis
Point coordinates with points input line by line; each line represents a closed contour

with no saddle points. Start a new card set for each line. A maximum of 50 lines with a maximum of 50 points is allowed for

as many as 30 components.

II. Case input (on file TAPE7), in list-directed format:

Variable

name

PO(2)

PO(3)

x1, y1, z1,

 x_{2}, y_{2}, z_{2}

Record	Variable name	Description	Default
1	IDCAS	Case identification (up to 10 characters	'CASE 1'
	хмасн	Mach number	1.
	ALPHD	Angle of attack, deg, a positive angle	0.
	xo zo	Origin for rotation of α	0. 0.
	NX	The number of equal intervals into which that portion of the X-axis between the double Mach cone is divided; <100	10
	NTHETA	The number of equal intervals into which the domain of θ (- $\pi/2 \le \theta \le 3\pi/2$) is divided; ≤ 48 and must be divisible by 4	4
	NCON	=0, continue reading case cards ≠0, read new geometry	0
	NPR	<pre>=0, output regular and debug printing - use with caution, can generate a great amount of printing =1, print all S(X,θ) =N, print every nth S(X,θ)</pre>	4



Data Output

The output file is defined as TAPE6.

I. Geometry output:

The coordinates of all the input components are always printed. Complete printed output of the scaled and offset coordinates and printed output of the coordinates rotated through angle of attack α may be obtained if the input variable IPR is not equal to zero.

II. Case output:

The case input is printed as the heading. An option is provided so that the user may specify the number of values of θ at which printing for the area distribution of each component, as well as the total area distribution, is desired. The component capture area is subtracted from the area distribution of the fusiform components. Many of the intermediate results may be obtained through the use of the print option. The D/Q associated with each value of θ is always printed, as well as D/Q and $C_{D,W}$ (wave-drag coefficient), for the entire aircraft.

An example of the program output for Mach 1.414 with several angle-of-attack variations, as illustrated in table III, is given in table IV.

Operations

This program was written in FORTRAN Version 5 for Control Data Cyber series 6000 computers with the Network Operating System and library tape. Approximately 110 000 octal locations of core storage are required. The source version of the program is set up in CDC MODIFY format and uses the OVERLAY structure for optimum use of core storage.

File usage is as follows:

<u>File</u>	<u>Us e</u>
TAPE5	Geometry input data
TAPE6	Output
TAPE7	Case input data
TAPE8, TAPE9,	
TAPE8, TAPE9, TAPE10, TAPE11,	Scratch files
TAPE12	

A representative procedure file for executing the program using the compile file from the CDC MODIFY program library is as follows:

WAVY5PF,TO700,CM120000.

USER,444444N,PASSWORD.

CHARGE,000000,LRC.

GET,OPL=WAVY5PL/UN=000000N.

MODIFY,F,I=0,L=0.

REWIND,COMPILE.

FTN5,I,L=0.

GET,TAPE7=CASDAT,GEOMDAT.

LGO,GEOMDAT.

R333 U.K.NAME



CONCLUDING REMARKS

A supersonic zero-lift wave-drag computer program has been developed to extend the geometry input capabilities of previous versions of the program. Wave drag analysis can now be performed on highly accurate representations of aircraft design concepts. This document serves as a guide for current and future applications of the program.

Langley Research Center National Aeronautics and Space Administration Hampton, VA 23665 September 15, 1983

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TABLE I .- PROGRAM ELEMENTS

Element name	Туре	Approximate size (octa1)	Calls	Called by
WIST	Program	25330	MIRIMG, SFUSI, SLIFT	WAVDRAG
CASPRNT	Subroutine	52		CASREAD, SLOPE, ENTPTS, OUT
CASREAD	Program	17222	CASPRNT	WAVDRAG
CONECT	Function	1440	MOVE, OMIT, REVERSE	SLIFT
EMLORD	Subroutine	33 05	MATINV	OUT
ENDPTS	Program	17202	CASPRNT	WAVDRAG
INLAP	Function	156		SFUSI, SLIFT
LEVOUT	Function	123		SLIFT
MATINV	Subroutine	447		EMLORD, XMAT
MIRIMG	Subroutine	14366		ADIST
HOVE	Subroutine	47		CONECT
CMIT	Subroutine	47		CONECT
CUT	Program	10007	CASPRNT, EMLORD	WAVDRAG
REVERSE	Sub: outine	24		CONECT
SFUSI	Subroutine	53	INLAP	ADIST
SLIFT	Subroutine	2017	CONECT, INLAP, LEVOUT	ADIST
SLOPE	Program	17061	CASPRNT	WAVDRAG
START	Program	17225		WAVDRAG
WAVD ₹AG	Pr. ogram	251	START, CASREAD, SLOPE, XMAT, ENDPTS, ADIST, OUT	
XMA T	Program	24337	MATINV	WAVDRAG

15

-.060

-.124

-.159

-.164

.501

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*NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE * 221.22 WING I 1.0000 5 0.0000 0.0000 0.0000 1 21 1 -.0160 22.7660 10.0000 0.0000 22.9043 10.0000 23.1808 10.0000 -.0425 -.0620 -.0755 23.4573 10.0000 23.733R 10.0000 24.0103 10.0000 -.0820 24.286F 10.0000 -. OR20 24.5633 10.0000 -.0755 24.8398 10.0000 -.0620 25.1163 10.0000 -.00425 25.5310 10.0000 0.0000 25.1163 10.0000 .0425 .0755 .0820 24.2868 10.0000 24.8398 10.0000 .0620 24.5633 10.0000 .0755 74.0103 10.0000 .0820 23.7338 10.0000 23.4573 10.0000 .0620 22.9043 10.0000 .0160 22.7660 10.0000 0.0000 23.1808 10.0000 .0425 0.0000 20.7099 8.3890 20.9249 P.3675 -.0204 21.3623 A.3238 -.0537 8.2790 21.8098 -.0777 22.2680 8.2332 -.0938 22.7370 8.1863 -.1010 23.7097 8.0390 23.2170 8.1392 -.1002 -.0914 24.2140 8.0386 -.0744 24.7309 7.9869 -.0505 25.5310 7.9069 0.0000 24.7309 7.9869 .0505 P.0386 .0914 8.1382 .1002 23.7097 8.0890 23.2176 24.2140 .10744 .0777 .0938 22.7370 A.1863 .1010 22.2680 8.2332 21.8098 8.2790 20.9249 .0040 20.7099 8.3890 0.0000 A.3238 21.3623 .0537 8.3675 0.0000 6.7939 6.7011 6.8391 19.0169 -.0241 19.6019 18.7317 -.0634 6.6051 -.0916 6.5056 -.1104 -.1186 20.2074 20.8347 21.4847 6.4026 22.1594 6.2956 -.1173 22.8591 6.1846 -.1067 23.5858 6.0694 -.0865 24.3409 5.9497 -.0595 25.5310 5.7609 0.0000 24.3409 5.9497 .0585 6.2956 .1067 23.5858 6.0694 .OP65 22.8591 6.1846 22.1594 .1173 6.5056 21.4847 6.4026 .1186 20.8347 .1104 20.2074 6.6051 .0916 19.6019 6.7011 .0634 19.0169 6.7939 .0241 18.7317 6.8391 0.0000 16.7797 5.3097 0.0000 17.1784 5.2776 -.0280 17.9869 5.2125 -.0740 5.0098 -.1076 19.650A 5.0787 10.9109 5.1462 -.1305 20.5069 -.1411 4.9395 4.7948 -.1053 21.3807 -.1475 22.271C 4.8679 -.1288 23.1791 4.7202 -.0718 24.1056 4.7202 .0718 24.1056 25.5310 4.6056 0.0000 23.1791 .1053 .128F 4.7948 22.2710 4.8679 21.3807 4.9395 .1405 20.5069 5.0098 .1411 19.6508 5.0787 .1305 18.8109 5.1462 .1076 16.7797 17.9869 5.2125 .0740 17.1784 5.2776 .0280 5.3097 0.0000 3.5000 -.0850 15.0230 16.1290 14.4700 3.5000 0.0000 3.5000 -.0320 3.5000 -.1240 3.5000 19.4470 3.5000 -.1640 17.2350 18.3410 -.1510 20.5540 3.5000 - .1640 21.6600 3.5000 -.1510 22.7660 3.5000 -.1240 3.5000 3.5000 -.OR50 25.5310 0.0000 23.8720 3.5000 .0850 23.8720 .1240 .1510 .1640 22.7660 3.5000 21.6600 3.5000 20.5540 3.5000 17.2350 19.4470 3.5000 .1640 18.3410 3.5000 .1510 3.5000 .1246 16.1290 3. FOOC OR 50 15.0230 3.5000 .0320 14.4700 3.5000 0.0000 INTHE 21 0.000 2 1 1 39 0.000 0.000 0.000 .032 15.576 .106 17.235 14.470 0.000 15.023 1.500 1.500 1.500 .060 1.500 1.500 16.129 1.500 .085 16.682 .124 17.7PF 1.500 .139 18.341 1.500 .151 18.894 1.500 .159 19.447 1.500 20.001 .164 1.500 1.500 .166 20.554 .164 21.107 1.500 .159 21.660 1.500 .151 22.213 1.500 .139 1.500 22.766 .085 1.500 .124 23.319 .106 1.500 23.872 24.425 1.500 .060 25.531 1.500 0.000 24.425 1.500 -.060 1.500 23.872 -.085 23.319 1.500 -.106 22.766 1.500 -.124 22.213 1.500 -.139 21.660 1.500 -.151 21.107 1.500 -.159 -.166 20.554 1.500 -.164 20.001 1.500 19.447 1.500 -.164 18.894 1.500 17.788 -.159 18.341 -.151 1.500 -.139 1.500 17.235 -.124 16.682 1.500 -.106 16.129 1.500 1.500 -.085 1.500 1.500 1.500 15.576 15.023 -.032 14.470 0.000 --060 .501 16.129 .032 0.000 16.5791 .501 17.0692 .501 .060 .085 .501 18.4795 17.5393 .501 18.0094 .106 .501 .124 18.9496 .501 .139 19.4197 .501 .151 19.8898 .501 .159 20.3599 .501 .164 20.830 .501 .166 21.3001 .501 .164 .159 .501 22.2403 21.7702 .501 .151 22.7104 .501 .139 23.1805 .501 .124 23.6506 .501 .106 24.1207 .501 . OR5

24.590A

24.1207

22.7104

21.3001

.060

-.085

-.139

-.164

25.531

23.6506

22.2403

20.830

.501

.501

.501

.501

0.000

-.106

-.151

-.166

24.5908

23.1805

21.7702

20.3599

.501

.501

.501

.501

1

ORIGINAL PAGE IS OF POOR QUALITY

TABLE II .- Continued

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16.4795
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                   -.124
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                                                     16.129
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                                                           23.1164
                                                                      .2820
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                              23.1931
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                                                           23.2105
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                                                           23.9342
                                                                      . 4050
                                                                              -.5080
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ORIGINAL PAGE IS OF POOR QUALITY

TABLE II.- Continued

23. RR26	.2820	5960	23.4372	•1450	6340	23.7998	0.0000	6500
24.6306	0.0000	.6500	24.6274	.1450	.6340	24.6178	.2820	.5860
24.6021	.4050	.50R0	24.5814	.5080	.4050	24.5567	.5860	.2820
24.5291	.6340	.1450	24.5000	.6500	0.0000	24.4709	.6340	1450
24.4433	.5R60	2820	24.4186	.5080	4050	24.3979	• 4050	5080
24.3822	.2820	5860	24.3726	.1450	6340	24.3694	0.0000	6500
25.5300	0.0000	•6500	25.5300	.1450	.6340	25.5300	.2820	.5860
25.5300	.4050	.5080	25.5300	.5040	.4050	25.5300	.5860	.2820
25.5300	.6340	.1450	25.5300	.6500	0.0000	25.5300	.6340	1450
25.5300	•5860	2820	25.5300	•5080	4050	25.5300	.4050	5080
25.5300	• 2P20	5860	25.5300	.1450	6340	25.5300	0.0000	6500
'POD 1'	A 28 4							
4 0	0 25 2							
	-2.5000	0.0000	-2.5000		0.0000		-2.5000	0.0000
	-2.5000	0.0000	-2.5000	-	0.0000		-2.5000	0.0000
	-2.5000	0.0000	-2.5000		0.0000		-2.5000	0.0000
	-2.5000 -2.5000	0.0000	-2.5000		0.0000	-2.5000		0.0000
-2.5000		0.0000	-2.5000		0.0000		-2.500ú	0.0000
	-2.5000		-2.5000 -2.5000		0.0000	-2.50CO		0.0000
	-2.5000	0.0000 0.0000	-2.5000		0.0000		-2.5000	0.0000
• •	-2.5000	0.0000	-2.5000	-2 - 5000	0.0000	-2.5000	-2.5000	0.0000
	-2.5000	.2442	-1.1997	-2.4360	.2359	_1 1007	_2 2770	2121
-1.1998		.1729	-1.1998		.1221		-2.3779	.2121
	-2.2558	0.0000	-1.2001		0631	-1.1999	-2.2880	•0631 - 1331
	-2.3273	1727	-1.2003	-	2120	-1.2002		1221
-1.2003		2441	-1.2003		2358	-1.2003		2358 2120
-1.2002		1727	-1.2002		1221		-2.7359	0631
-1.2000		0.0000	-1.1999		.0631	-1.1998		.1221
-1.199R		•172A	-1.1997		.2121	-1.1997		2359
	-2.5000	.2442			,,,,,		-20001	• 2324
	-2.5000	-5069	.4728	-2.3694	.4878	.4538	-2.2488	.4351
	-2.1470	.3530		-2.0707	.2479		-2.0246	.1274
.3547	-2.0112	0.0000		-2.0308	1257		-2.0814	2417
.3029	-2.1594	3406		-2.2596	4163		-2.3756	4644
.3029	-2.5000	4017		-2.6251	4669		-2.7429	4207
.3547	-2.8456	3456	.3794	-2.9262	2461		-2.9788	1283
.4307	-2.9993	0.0000	.453R	-2.9853	.1300		-2.9374	. 2525
.4864	-2.8585	·3595	.4935	-2.7540	.4398		-2.6314	.4905
.4864	-2.5000	.5069						-
2.0466	-2.5000	.7012	2.0044	-2.3197	.6725	1.9560	-2.1545	.5983
1.9050	-2.0151	.4840	1.8547	-1.9115	.3399	1.8087	-1.8487	.1745
1.7696	-1.8295	0.0000	1.7401	-1.P561	1725	1.7216	-1.9244	3324
1.7152	-2.0302	4698	1.7216	-2.1676	5756	1.7401	-2.3275	6439
1.7696	-2.5000	6702	1.8087	-2.6745	6513	1.8547	-2.A3J9	5885
_	-2.9849	4849	1.9560	-3.0983	3455	2.0044	-3.1725	1803
	-3.2012	0.0000		-3.1806	.1825		-3.1123	.3536
	-3,0009	•5009	2.100%	-2.8536	•6123	2.0793	-2.6825	.6806
	-2.5000	•7012						
	-2.5000	.8658		-2.2770	.0311		-2.0733	•7392
	-1.9004	.5996		-1.7714	• 4206		-1.6918	.2169
	-1.6659	0.0000		-1.6965	2157		-1.7797	4158
	-1,9'00	5900		-2.0817	7246		-2.2819	8127
	-2.5000	8477		-2.7213	8245		-2.9300	7451
	-3.1124	6124		-3.2529	4346		-3.3433	2263
	-3.3762	0.0000		-3.3471	.2273		-3.2593	.4384
	-3.1197	.6197	20 4727	-2.9364	.7560	3.5982	-2.7254	.8399
	-2.5000 -2.5000	•8658 0397	4 0212	_2 2502	0013	4 0004	2 02.0	
	-1.8476	.9387 .6524	4.9212		.9013		-2.0363	.8029
	-1.583A	•6524 0•0000		-1.7043 -1.6145	•4595 2275		-1.6145	•2375 - 4505
	-1.8476	6524	4.8306		2375		-1.7043	4595
	-2.5000	9387	5.1194		8029 9103		-2.2583 -2.9729	9013
	-3.1707	6707		-2.7441 -3.3237	4755		-3.4202	8190
	241101		703770	-303631		7 . 3 7 32	-344606	2468





ORIGHMAL DOMEST OF POOR QUALLAY

TABLE II .- Continued

5.4086	-3.4530	0.0000	5.3952	-3,4202	.2468	5.3558	-3.3237	.4755
					.8190		-2.7441	.9103
	-3.1707	•6707	245771	-2.9729	140	701144	-201441	.7103
5.0198	-2.5000	.9387						
6.0868	-2.5000	.9789	5.9864	-2.2475	.9415	5.9052	-2.0143	.8417
5.8481	-1.8146	.6P54	5.8184	-1.6612	.4841	5.A184	-1.5645	.2509
	-1.5301	0.0000		-1.5614	2517		-1.6556	4871
								_
6.0464	-1.8083	6917	P. 1448	-2.0099	8514		-2.2448	9518
6.4316	-2.5000	9872	6.5342	-2.7559	9544	6.6180	-2.9944	8568
6.6774	-3.199R	6998	6.7084	-3.3578	4949	6.7084	-3.4565	2565
	-3.4895	0.0000		-3.4554	.2562		-3.3560	.493R
		·					: · · · · · · ·	
	-3.1976	.6976	0.3115	-2.9924	.8537	0.000	-2.8566	.9090
6.0868	-2.5000	.9749						
6.9605	-2.5000	.9935	6.8779	-2.2430	.9585	6.8262	-2.0043	.8590
6-9086	-1.7991	.7009	6.8262	-1.6410	.4957	6.8779	-1.5415	.2570
		0.0000		-1.5392	2576		-1.6372	4980
	-1.5065							
7.3302	-1.7945	7055		-2.0002	8657		-2.2410	9660
7.7023	-2.5000	-1.0000	7.7860	-2.7590	9660	7.8385	-3.0000	8660
7.8564	-3.2070	7070	7.8385	-3.3660	5000	7.7860	-3.4660	2590
	-3.5000	0.0000	•	-3.4660	.2590	7-4664	-3.3657	.4998
					.8628		-2.7576	9608
	-3.2055	.7055	19142	-2.9980	10020	7.0000	-24/3/0	• 4000
	-2.5000	.9935			<u>.</u>			
7.7190	-2.5000	1.0000	7.6788	-2.2410	•9660	7.6789	-2.0000	.8660
7.7200	-1.7930	.7070	7.7992	-1.6340	•5000	7.9112	-1.5340	• 25 90
	-1.5000	0.0000		-1.5340	2590		-1.6340	5000
			•			-	-2.2410	
	-1.7930	7070		2.0000	8660			9660
P. 8422	-2.5000	-1.000C	8.8833	-2.7590	9660	8.8832	-3.0000	8660
P. 8421	-3.2070	7070	A.7629	-3.3660	5000	8.6509	-3.4660	2590
A.5135	-3.5COO	0.0000	P.3603	-3.4660	.2590	8.2018	-3.3660	.5000
	-3.2070	.7070	-	-3.0000	. R660	7.7992	-2.7590	.9660
			14723	3.0000	•		20.370	• , , , ,
	-2.5000	1.0000	4					0440
14.0367	-2.5000	1.0000	14.0592	-2.24.1	•9660		-2.0000	.8660
14.2310	-1.7930	.7070	14.3683	-1.6340	•5000	14.5282	-1.5340	.2590
14.7000	-1.5000	0.0000	14.8718	-1.5340	2590	15.0317	-1.6340	5000
	-1.7930	7070	T. * 7 i	-2.0000	R660		-2.2410	9660
					9660		-3.0000	8660
	-2.5000	-1.0000		-2.7590				
	-3.2070	7070		-3.3660	5000	-	-3.4660	2590
14.7000	-3.500C	0.0000	14.5282	-3.4660	.2590	14.3683	-3.3660	•5000
14.2310	-3.2070	•7070	14.1256	-3.0000	.8660	14.0592	-2.7590	•9660
14.0367	-2.5000	1.0000						
	-2.5000	1.0000	20.5592	-2.2410	.9660	20.6256	-2.0000	.8660
		_			.5000	.	-1.5340	.2590
	-1.7930	•7070		-1.6340				
	-1.5000	0.0000		-1.5340	2590		-1.6340	5000
21.6690	-1.7930	7070	21.7744	-2.0000	8660	21.8408	-2.2410	9660
21.8633	-2.5000	-1.0000	21.8408	-2.7590	9660	21.7744	-3.0000	8660
21 - 6690	-3.2070	7070	21.5317	-3.3660	5000	21.3718	-3.4660	2590
		0.0000		-3.4660	.2590	-	-3.3660	.5000
	-3.5000							
	-3.2070	.7070	20.0256	-3.0000	.8660	20.7742	-2.7590	•9660
20.5367	-2.5000	1.0000						
26,1578	-2.5000	1.0000	26.2371	-2.2410	.9660	26.3492	-2.0000	.8660
	-1.7930	.7070	26.6396	-1.6340	.5000	26.7981	-1.5340	.2590
					2590	27.2008		5000
-	-1.5000	0.0000		-1.5340	7 - 1 - 1 - 1	•		
	-1.7930	7070	27.3211		8660	27.3212		9660
27.2801	-2.5000	-1.0000	27.200R	-2.7590	9660	27.0887	-3.0000	8660
26.9513	-3.2070	7070	26.7982	-3.3660	5000	26.6397	-3.4660	2590
	-3.5000	0.0000	-	-3.4660	.2590	26.2371	-3.3660	•5000
	-3.2070	.7070		-3.0000	·8660		-2.7590	.9660
			CO.1100	3.0000	• 5000	2001101	C # 1 3 7 U	. 7000
	-2.5000	1.0000						
	-2.5000	1.0000		-2.2410	•9660	27.5336		.8657
27.6698	-1.7945	•7055	27.8055	-1.6372	.4980	27.9314	-1.5392	.2576
	-1.5065	0.0000		-1.5415	2570		-1.6410	4957
	-1.7991	7009		-2.0043	4590		-2.2430	9585
-	-2.500C	9935		-2.7576	9608		-2.9980	8628
	-3.2055	7055	-	-3.3657	4998		-3.4660	2590
27.2977	-3.5000	0.0000	-27.2140	-3.4660	.2590	27.1615	-3.3660	•5000









ORIGINAL PAGE IS OF POOR QUALITY

27.1436 -3.2070	.7070	27.1615 -3.0000	.8660	27.2140 -2.7590	.9660
27.2977 -2.5000	1.0000				
28.5694 -2.5000	.9872	28.6827 -2.2448	.9518	28.8002 -2.0089	.8514
28.9131 - 1.8083	•6917	29.0136 -1.6556	.4º71	29.0948 -1.5614	.2517
29.1522 -1.5301	0.0000	29.1816 -1.5645	2509	29.1816 -1.6612	4841
29.1519 -1.8146	6854	29.0948 -2.0143	8417	29.0136 -2.2475	9415
28.9132 -2.5000	9789	28.8003 -2.7545	9492	28.6828 -2.9924	8537
28.5686 -3.1976	6976	2A.465A -3.3560	4938	28.3820 -3.4554	2562
28.3226 -3.489 5	0.0000	28.2916 -3.4565	.2565	28.2916 -3.3578	.4949
28.3226 - 3.1998	.6998	28.3820 -2.9944	.8568	28.4658 -2.7559	.9544
2P.5694 -2.5000	.9872				
28.9802 -2.5000	.9763	29.0829 -2.2482	.9390	29.1777 -2.0159	.4390
29.2586 -1.8174	•6P26	29.3205 -1.6657	.4P15	29.3592 -1.5709	.2492
29.3725 -1.5384	0.0000	29.3592 -1.5709	2492	29.3205 -1.6657	4815
29.2586 -1. 8174	6826	29.1777 -2.0159	8390	29.0829 -2.2482	9390
28.9802 -2.500C	9763	28.8767 -2.7538	9464	28.7797 -2.9915	4520
28.6961 -3.1965	6965	28.6317 -3.3542	4928	28.5915 -3.4529	2555
28.5779 -3.4862	0.0000	28.5915 -3.4529	. 2555	28.6317 -3.3542	.4928
28.6961 -3. 1965	.6965	28.7797 -2.9915	.8520	28.8767 -2.7538	.9464
28.9802 -2.5000	.9763				
31.5009 -2.5000	.3391	31.5663 -2.2841	.8044	31.6190 -2.0859	.7173
31.6562 -1.9160	.5P40	31.6750 -1.7870	•4116	31.6750 -1.7047	.2135
31.6561 -1.6744	0.0000	31.6189 -1.7000	2147	31.5662 -1.7788	4163
31.5009 -1.9065	5935	31.4267 -2.0776	7317	31.3490 -2.2792	8227
31.2724 -2.5000	8590	31.2031 -2.7237	8338	31.1463 -2.9332	7506
31.1054 -3.1152	6152	31.0846 -3.2539	4352	31.0845 -3.3409	2256
31.1054 -3. <u>3</u> 699	0.0000	31.1463 -3.3372	.2247	31.2032 -3.2475	.4315
31.2724 -3.1076	.6076	31.3489 -2.9257	.7376	31.4266 -2.7190	.8162
31.5009 -2.5000	.8391				
33.034A -2.5000	.6921	33.0653 -2.3217	.6649	33.0644 -2.1567	.5944
33.0910 -2.0148	.4R52	33.0844 -1.9056	.3433	33.0653 -1.8351	.1783
33.034R -1.8079	0.0000	32.9945 -1.8274	1804	32.9469 -1.8923	3510
32.8950 -1.99 93	5007	32.8423 -2.1432	6179	32.7924 -2.3137	6944
32.7498 -2.5000	7241	32.7150 -2.6886	7028	32.6936 -2.8652	6323
32.6861 -3.0173	5173	32.6936 -3.1323	3652	32.7150 -3.2028	1886
32.7498 -3.2241	0.0000	32.7924 -3.1944	.1863	32.8423 -3.1179	•356R
32.8950 -3.0007	•5007	32.9469 -2.8510	.6077	32.9945 -2.6904	•6726
33.0348 -2.5000	•6921				
33.7219 -2.5000	.6151	33.7300 -2.3414	•5932	33.7301 -2.1929	.5319
33.7220 -2.0648	.4352	33.7061 -1.9657	.3085	33.6834 -1.901	.1600
33.6556 -1.8774	0.0000	33.6242 -1.8954	1617	33.5912 -1.9546	3149
33.5590 -2.0519	4481	33.5298 -2.1817	5513	33.5058 -2.3348	6174
33.4886 -2.5000	6413	33.4798 -2.6660	6202	33.4797 -2.8211	5562
33.4886 -2.9537	4537	33.5058 -3.3536	3197	33.5299 -3.1148	1645
33.5590 -3.1334	0.0000	33.5911 -3.1082	.1627	33.6241 -3.0422	.3130
33.6556 -2.9405	•4405	33.6835 -2.8097	.5364	33.7061 -2.6593	.5957
33.7219 -2.5000	.6151				
36.0004 -2.5000	.2767	36.0004 -2.4284	•2673	36.0003 -2.3616	.2402
36.0003 -2.3042	.1958	36.0002 -2.2598	.1384	36.0001 -2.2326	.0716
36.0000 -2.2232	0.0000	35.9999 -2.2326	0716	35.9998 -2.2598	1384
35.9997 -2.3042	1958	35.9997 -2.3616	2402	35.9996 -2.4284	2675
35.9996 -2.5000	2769	35.9996 -2.5716	2675	35-9997 -2.6384	2402
35.9997 -2.6958	195P	35.9998 -2.7402	1384	35.9999 -2.7674	0716
36.0000 -2.7768	0.0000	36.0001 -2.7674	.0716	36.0002 -2.7402	.1384
36.0003 -2.695R	-1958	36.0003 -2.6384	•2402	36.0004 -2.5716	•2673
36.0004 -2.5000	•2767				
37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000
37. F000 -2.500C	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000
31.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.0000 -2.5000	0.0000
37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000
37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000
37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000
37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.3000
37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000	37.5000 -2.5000	0.0000

TABLE II. - Continued



37.5000	-2.5000	0.0000						
1000 St								
5 0		20 1,000		-				
-2.5000			-2.5000		0.0000	-2.5000	-	0.0000
-2.5000 -2.5000				-2.5000 -2.5000	0.0000		-2.5000	0.0000
-2.5000			•	-2.5000	0.0000		-2.5000 -2.5000	0.0000
-2.5000				-2.5000	0.0000		-2.5000	0.0000
-2.5000			-2.5000		0.0000		-2.5000	0.0000
-2.5000			-2.5000		0.0000	-2.5000	~2.5000	0.0000
-2.5000			-2.5000	-2.5000	0.0000	-2.5000	-2.5000	0.0000
-2.5000 -1.1997			1 1007		2250	1 1007		
-1.199P		• • •		-2.4369 -2.2879	•2359 •1221	-1.1997	-2.3779	.2121 .0631
-1.2000				-2.2641	0631		-2.2880	1221
-1.2002			-1.2003		2120		-2.4369	2358
-1.2003	-2.5000	2441	-1.2003		2358	-1.2003		2120
-1.2002	-2.6727		-1.2002		1221	-1.2001	-2.7359	0631
-1.2000	-		-1.1999		.0631	-1.1998		.1221
-1,1998			-1.1997	-2.6221	•2121	-1.1997	-2.5631	.2359
-1.1997	-2.5000		4770	-2 3606	4070	4.6.20	2 24 00	/ 251
	-2.1470			-2.3694 -2.0707	•4878 •2479		-2.2488 -2.0246	.4351 .1274
	-2.0112			-2.0308	1257		-2.0814	2417
	-2.1594			-2.2596	4163		-2.3756	4644
	-2.5000			-2.6251	4669		-2.7429	4207
	-2.8456		.3794	-2.9262	2461		-2.9788	1283
	-2.9993			-2.9853	.1300		-2.9374	.2525
	-2.8585		.4935	-2.7540	,4398	•4935	-2.6314	.4905
	-2.5000		2 22/	2 2:03				
	-2.5000 -2.0151	•7012 •4849		-2.3197 -1.9115	.6725 .3399		-2.1545	.5983
	-1.8298	0.0000		-1.8561	1725		-1.9487 -1.9244	.1745 3324
	-2.0302			-2.1676	5756		-2.3275	6439
	-7.5000			-2.6745	6513		-2.8399	5885
1.9050	-2.9849	4849	1.9560	-3.0983	3455		-3.1725	1803
	-3.2012	0.0000		-3.1906	.1825		-3.1123	.3536
	-3.0009	12.1.	2.1001	-2.8536	.6123	2.0793	-2.6825	.6806
	-2.5000		7 7514	-2 2770	0211	2 (7 20		72.62
	-1.9004			-2.2770 -1.7714	.8311 .4206		-2.0733 -1.6918	.7392 .2169
	-1.6659			-1.6965	2157		-1.7797	4158
	-1.9100			-2.0817	7246		-2.2819	8127
	-2.5000		3.6730	-2.7213	R245		-2.9300	7451
	-3.1124	6124		-3.2529	4346	-	-3.3433	2263
	-3.3762	0.0000		-3.3471	.2273		-3.2593	.4384
	-3.1197		3.9555	-2.9364	.7560	3.8982	-2.7254	.8399
	-2.5000	.8658 .9387	4 0212	_2 2502	0013	4 9304	-2 0242	
	-1.8476	.6524		-2.2583 -1.7043	.9013 .4595		-2.0363 -1.6145	.8029 .2375
	-1.5838	0.0000	-	-1.6145	2375		-1.7043	4595
-	-1.8476	6524		-2.0363	8029	-	-2.2583	9013
5.0198	-2.5000	9387	5.1194	-2.7441	9103		-2.9729	8190
	-3.1707	6707		-3.3237	4755	5.3952	-3.4202	2468
	-3.4530			-3.4202	.2468		-3.3237	.4755
	-3.1707	•6707	5.2127	-2.9729	•P190	5.1194	-2.7441	.9103
	-2.5000 -2.5000	.93R7 .9789	5.0944	-2.2475	.9415	5.0062	-2.0142	. 6417
	-1.8146	.6854		-1.6612	.4841		-2.0143 -1.5645	.4417 .2509
	-1.5301	0.0000		-1.5614	2517		-1.6556	4871
	-1.8083	6917	6, 1998	-2.0089	R514		-2.2448	9518
6.4316	-2.5000	9872	6,5342	-2.7559	9544		-2.9944	8568
	-3.1998	6998		-3.3578	4949	6.7084	-3.4565	2565
6.6774	-3.4895	0.0000	6.6180	-3.4554	.2562	6.5342	-3.3560	.4938





TABLE II.- Continued ORIGINAL PAGE IS OF POOR QUALITY

6.4314 -3.1976	.6976	6.3172 -2.9924	.8537	6.2500	-2.8566	.9090
6.0868 -2.5000	.9789					
6.9605 -2.5000	.9935	6.8779 -2.2430	. 9585	6.8262	-2.0043	.8590
6.9006 -1.7991	•7009	6.8262 -1.6410	•4957	6.8779	-1.5415	.2570
6.9605 -1.5065	0.0000	7.0686 -1.5392	2576	7.1945	-1.6372	4980
7.3302 -1.7945	7055	7.4664 -2.0002	8657	7.5933	-2.2410	9660
7.7023 -2.5000	-1.0000	7.7860 -2.7590	9660		-3.0000	8660
7.8564 -3.2070	7070	7.8385 -3.3660	5000		-3.4660	2590
7.7023 -3.5000	0.0000	7.5933 -3.4660	.2590		-3.3657	.4998
7.3302 -3.2055	.7055	7.1945 -2.9980	.8628	7.0686	-2.7576	.9608
6.9605 -2.5000	.9935	7 4700 0 0:10	0440	7 / 700	2 0000	00
7.7199 -2.5000	1.0000	7.6788 -2.2410	.9660		-2.0000	.8660
7.7200 -1.7930 R.0486 -1.5000	•7070	7.7992 -1.6340	•5000		-1.5340	• 2590
P.5135 -1.7930	0.0000	R. 2019 -1.5340	2590		-1.6340	5000
P.8422 -2.5000	7070 -1.0000	8.650P -2.0000 8.8833 -2.7590	8660 9660		-2.2410 -3.0000	9660
8.8421 -3.2070	7070	R.7629 -3.3660	5000	_	-3.4660	8660 2590
8.5135 -3.5000	0.0000	8.3603 -3.4660	.2590		-3.3660	•5000
8.0487 -3.2070	•7070	7.9113 -3.0000	.8660		-2.7590	.9660
7.7199 -2.5000	1.0000	7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7. 7	***************************************		- 201370	• 1000
14.0367 -2.5000	1.0000	14.0592 -2.2410	.9660	14.1256	-2.0000	.8660
14.2310 -1.7930	•7070	14.3683 -1.6340	.5000		-1.5340	2590
14.7000 -1.5000	0.0000	14.8718 -1.5340	2590		-1.6340	5000
15.1690 -1.7930	7070	15.2744 -2.0000	8660		-2.2410	9660
15.3633 -2.5000	-1.0000	15.3408 -2.7590	9660		-3.0000	8660
15.1690 -3.2070	7070	15.0317 -3.3660	5000		-3.4660	2590
14.7000 -3.5000	0.0000	14.5282 -3.4660	.2590	14.3683	-3.3660	.5000
14.2310 -3.2070	•7070	14.1256 -3.0000	.8660	14.0592	-2.7590	.9660
14.0367 -2.5000	1.0000					
20.5367 -2.5000	1.0000	20.5592 -2.2410	•9660	20.6256	-2.0000	.8660
20.7310 -1.7930	•7070	20.8683 -1.6340	•5000	21.0282	-1.5340	.2590
21.2000 -1.5000	0.0000	21.3718 -1.5340	2590		-1.6340	5000
21.6690 -1.7930	7070	21.7744 -2.0000	8660		-2.2410	9660
21.8633 -2.5000		21.8408 -2.7590	9660		-3.0000	8660
21.6690 -3.2070	7070	21.5317 -3.3660	5000		-3.4660	2590
21.2000 -3.5000	0.0001	21.0282 ~3.4660	•2590		~3.3660	•5000
20.7310 -3.2070	.7070	20.6256 ~3.0000	. 8660	20.5592	-2.7590	• 9660
20.5367 -2.5000	1.0000	24 2271 -2 2410	0440	24 2402	2 2000	0440
26.1578 -2.5000 26.4865 -1.7930	1.0000 .7070	26.2371 -2.2410 26.6396 -1.6340	•9660	26.3492		• 8660 3500
26.9514 -1.5000	0.0000	27.0888 -1.5340	- 2590	26.7981	-1.6340	•2590 - •5000
27.2800 -1.7930	7070	27.3211 -2.0000	8660	27.3212		9660
27.2801 -2.5000	-1.0000	27.2008 ~2.7590	9660		-3.0000	8660
26.9513 -3.2070	7070	26.7982 -3.3660	5000		-3.4660	2590
26.4865 -3.5000	0.0000	26.3491 -3.4660	.2590	26.2371		.5000
26.1579 -3.2070	.7070	26.1168 -3.0000	.8660	26.1167		.9660
26.1578 -2.5000	1.0000	•				
27.2977 -2.5000	1.0000	27.4067 -2.2410	.9660	27.5336	-2.0002	.8657
27.6698 -1.7945	•7055	27.8055 -1.6372	.4980	27.9314	-1.5392	. 2576
28.0395 -1.5065	0.0000	28.1221 -1.5415	2570	28.1738	-1.6410	4957
28.1914 -1.7991	7009	28.1738 -2.0043	8590	28.1221	-2.2430	9585
28.0395 -2.5000	9935	27.9314 -2.7576	-,9608	27.8055	-2.9980	8628
27.6698 -3.2055	7055	27.5330 -3.3657	4998	27.4067	-3.4660	2590
27.2977 -3.5000	0.0000	27.2140 -3.4660	.2590	27.1615		•5000
27.1436 -3.2070	•7070	27.1615 -3.0000	.8660	27.2140	-2.7590	.9660
27.2977 ~2.5000	1.0000					
28.5684 ~2.5000	.9872	28.6827 -2.2448	.9518	28.8002		.8514
28.9131 -1.8083	•6917	29.0136 -1.6556	.4871	29.0948		.2517
29.1522 -1.5301	0.0000	29.1816 -1.5645	2509	29.1816	-	4841
29.1519 -1.8146	6854 9789	29.0948 -2.0143	8417	29.0136		9415
28.9132 -2.5000 28.5686 -3.1976		28.4458 -2.7545	-,9492	28.6828		8537
28.3226 -3.4895	6976 0.0000	28.4658 -3.3560 28.2916 -3.4565	4938 .2565	28.3820		2562
28.3226 -3.1998	.6998	28.3820 -2.9944	• 2000 • 8568	28.2916 28.4658		.4949 .9544
222770	-5.,5		¥ >0 0	F F-40 70	601777	• ~ . ~ ~ ~





TABLE II .- Continued

ORIGINAL PARTIES

	584 - 2.50		872			_			
	102 -2.50		763	29.0829		• 9390		-2.0159	.9390
	86 -1.P		826	29.3205	_	.4815		-1.5709	.2492
	725 -1.53		1000	29.3592		2492		-1.6657	4815
	86 -1.8		826	29.1777		8390		-2.2482	9390
	102 -2.50		763	28.8767		-,0464		-2.9915	8520
	761 -3.19	-	965	28.6317		4928		-3.4529	2555
	779 -3.4	_	0000	28.5915		.2555		-3.3542	.4928
	761 -3.19		965	28.7797	-2.9915	. 8520	28.9767	-2.7538	.9464
	302 -2.50		763						
	009 -2.50		391	31.5663		.8044		-2.0859	.7173
	62 -1.9		840	31.6750		.4116		-1.7047	.2135
	61 -1.6		000		-1.7000	2147		-1.7788	4163
	009 -1.90		935	31.4267		7317		-2.2792	8227
_	724 -2.50		590	31.2031		8338		-2.9332	75 06
	54 -3.1		152	31.0846		4352		-3.3409	2256
)54 - 3.36		0000	31.1463		•2247		-3.2475	.4315
	724 -3.10		076	31.3489	-2.4271	•7376	31.4200	-2.7190	.9162
	009 -2.50	-	391	53 0453	2 2217	4440	22 0044	-0 1647	50//
	148 -2.50		921	33.0653		•6649		-2.1567	.5944
	210 -2.03		R52	33.0844		.3433		-1.8351	.1783
	34A -1.8(000	32.9945		1804	-	-1.8923	3510
	950 -1.99		007 241	32.8423		6174		-2.3137 -2.8652	-,6944
	188 -2.50			32.7150		7028 3652			6323
	361 -3. 03		173	32,6936		.1863		-3.2028 -3.1179	1886 .3568
	750 -3.00		000 007	32.9469		.6077		-2.6804	.6726
	348 -2.50		921	32.4404	-240710	•0077	3667777	-240004	•0120
	219 -2.50		151	33.7300	-2-3414	.5932	33.7301	-2.1929	.5319
_	20 -2.00		352	33.7061		.3085		-1.9018	1600
	556 -1.81	-	000	33.6242		1617		-1.9546	3149
_	90 -2.0!	-	491	33.5298		5513		-2.3348	6174
	386 -2.5		413	33.4798		6202		-2.8211	5562
	186 -2.0		537	33.5058		3197		-3.1148	1645
	590 -3.1		000	33.5511		.1627		-3.0422	.3130
	56 -2.9		405	33.6835		.5364		-2.6593	.5957
	219 -2.50	_ : _	151			• • • • • • • • • • • • • • • • • • • •			•
36.00	004 -2.50	000 .2	767	36.0004	-2.4284	.2673	36.0003	-2.3616	.2402
36.00	003 -2.36	042 .1	952	36.0002	-2.2598	.1384	36.0001	-2,2326	.0716
36.00	000 -2.22	232 0.0	000	35.9999	-2.2326	0716	35.9998	-2.2598	1384
35.99	97 -2.30	0421	958	35.9997	-2.3616	2402	35.9996	-2.4284	2675
35.90	96 -2.50	0002	769	35.9996	~2.5716	2675	35.9997	~2.63R4	2402
35.99	997 -2.69	9581	95 R	35.9998	-2.7402	1384	35.9999	-2.7674	0716
36.00	00 -2.7	768 0.0	000	36.0001	-2.7674	.0716	36.0002	-2.7402	.1384
35.00	003 -2.69	95P .1	958	36.0003	-2.6384	.2402	36.0004	-2.5716	.2673
36.00	004 -2.50	000 •2	767						
	000 -2.50		000	37.5000		0.0000		-0.5000	0.0000
	000 -2.50		000	37.5000		0.0000		-2.5000	0.0000
	000 -2.50		0000	37.5000	-	0.0000		-2.5000	0.0000
	000 -2.50		000	37.5000		0.0000		-2.5000	0.0000
	000 -2.50		000	37.5000		0.0000		-2.5000	0.0000
	000 -2.50		000	37.5000		0.0000		-2.5000	0.0000
	000 -2.50		0000	37.5000	-	0.0000		-2.5000	0.0000
	000 -2.50		000	37.5000	-2.5000	0.0000	37.5000	-2.5000	0.0000
	000 -2.50	0.0	1000						
PICHT (E ^	~ -	^ -					
1	0 5	5 0.	7.5	0. (2 75	2 112	4	
75	3.112	0.	3.75	3.112		3.75	3.112	0.	
3.75	3.112	0. 0.5	3.75	3.112		. E	3.88	0.	
• 5 • 5	3.2 3.5	•05 ••025	4.5 4.5	3 • 5 3 • 2	•025 ••05	4.5	3,70	U •	
) • 5 •	3.226	.10	5.	3.75	•05	5.	4.4	0.	
•	3.75	05	5.	3.226		•	• • •	•	
, p	3.3	.05	5 e	4.15	•025	5. P	5.18	0.	
•	- • •				100		- 710		





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TABLE II.- Concluded

5. P	4.15	~.025	5.8	3.3	05			
4.25	3.361	0.	6.25	4.4	0.	6.25	5.61	٥.
6.25	4.4	0.	6.25	3.361	0.			
	CANARD							
7 1	0 5	5 0.	-2.5	-5. 0	•			
3.75	1.888	0.	3.75	1.688	0.	3.75	1.988	0.
3.75	1.888	0.	3.75	1.888	0.			
4.5	1.8	• 0 5	4.5	1.5	.025	4.5	1.12	0.
4.5	1.5	025	4.5	1.8	05			
F .	1.774	.10	5.	1.25	• 05	5.	• 6	٥.
5	1.25	05	5.	1.774	10			
5 P	1.7	•05	5 . A	• 85	.025	5.8	18	٥.
F . A	. 85	025	5 . P	1.7	05			
6.25	1.639	0.	6.25	•6	0.	6.25	61	0.
6.25	• 6	0.	6.25	1.639	٥.			
PRPACE	•							
R 1	0 7	4 0.	0.	0. 0.				
28.75	-1.549	.259	28.75	1.534	•25A	28.75	1.5	0.
28.75	1.534	259	28.75	-1.549	259	28.75	-1.515	0.
25.75	-1.549	.259						
20.1	-1.56	.259	29.1	1.534	.259	29.1	1.5	0.
29.1	1.534	259	29.1	-1.56	259	29.1	-1.54	0.
29.1	-1.76	.259						
20.5	-1.58	.259	29.5	1.534	. 259	29.5	1.5	0.
20.5	1,534	259	29.5	-1.58	259	29.5	-1.55	0.
29.5	-1.5°	.259						
30.	-1.59	.259	30.	1.534	.259	30.	1.5	Ů.
30.	1.534	259	30.	-1.59	259	30.	-1.6	0.
30 -	-1.50	.259						



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TABLE III .- SAMPLE CASE INPUT

CHECK 1 1.414 0. 0. 0. 50 16 0 8
CHECK 2 1.414 2. 0. 0. 4*
CHECK 3 1.414 2. 20. -1. 4*

2 23857 11517 115457 175457

TABLE TV. - SAMPLE CASE OUTPUT

ORIGINAL PAGE IS OF POOR QUALITY

2067 00812 01000 0100

ZERO LIFT MAVE DRAG HITH ARBITRARY GEOMETRY INPUT

ENTER START

CONFIGURATION DESCRIPTION

NUNSYMMETRICAL TWIN BODY GEGNETRY SAMPLE REFERENCY AREA ... 221.2200 PRINT CODE ... O

44			22.9043 25.9043 25.0103 25.0103 25.0503 20.024 22.7370 23.7097 21.8098 21.867	0 00000 00000 00	2 0160 0820	,				
CUUCKU WAR		00000 00000 00000 00000 00000 00000 0000	22.9043 24.0503 24.0503 24.0503 26.053 26.737 22.737 21.809 21.867 21.867	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000	2 0160 0820 0043	,				
~~~~~~		000000000000000000000000000000000000000	22.9043 24.6133 24.6133 25.6133 22.7370 22.7370 23.7097 21.8098 24.3609	0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.000000	0160	•	>-	7	×	>
		00000000000000000000000000000000000000	24,0103 24,0103 24,51163 23,4573 22,7370 22,7370 23,7090 21,809 21,867 21,867	0.0000 0.0000 0.0000 0.0000 0.0000 88.3675 88.3675 89.279 8.279 8.279	0820	23,1808	10.0000	0425	23,4573	10.000
		1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	25.1163 24.5633 22.5733 22.7370 22.7370 21.009 21.664 21.664 21.666	0.0000 0.0000 0.0000 0.0000 8.3675 8.1863 8.1863 8.2790 6.7939	0043	24.2868	10.0000	0820	24.5633	10.000
		00000 00000 00000 00000 00000 00000 0000	24,5633 23,4573 20,924 22,7370 23,7097 21,6098 21,464 24,3409	0.0000 0.0100 8.3675 7.9859 8.2890 8.2790 6.7939		25.5310	10.000	00,00	25.1153	10.0000
		0.00000 0.00000 0.00000 0.00000 0.00000 0.00000	23.4573 20.0240 22.7370 23.7090 21.8098 21.867 24.3609	0.0100 8 3675 8.1863 7.9859 8.0890 8.2790 6.7939	.0755	24.2868	10.0000	. 06 20	24.0103	10.0000
•		0.0000 1.00000 1.0074 1.00000 0.00000 1.00000	20.9249 22.7370 24.7309 23.7097 21.8098 19.0169 21.4847	2575 1863 1863 0890 2790 7939	.0620	23,1808	10.0000	.0425	22,9043	10.000
		00000 00000 00000 00000 00000 00000	20.9249 24.7370 23.7097 21.8098 19.0169 21.4847	. 1863 . 1863 . 0890 . 2790 . 7939				,		
		00000 00000 00000 00000 00000	22.7370 24.7309 21.8098 19.0169 21.4847	.1863 .0859 .2790 .7939	-,0204	21.3623	4.3238	0537	21.8098	8.279J
		1074 1000 0000 0000 0000 0000	24.7309 23.7097 21.8098 19.0169 21.484.7 24.3409	2790 2790 7939	1010	23.2176	8.1382	- 1002	23.7097	8.0897
	20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.0000	21.404.4 21.404.4 24.404.4	. 2790 . 7939 . 7939	2000-1	25.5310	****	0000	405/°42	7087.
	20020	0.0000	19.0169 21.4847 24.3409	7939	7770	2012 00 0	3051.8	1002	0161.02	6.3675
	50000	0.0000	19.0169 21.4847 24.3409	. 7939						
	5046	1104	24.3409	4026	0241	19,6019	6.7011	0634	20.2074	6.6051
	466	3700 -	24.3409		1186	22.1594	6.2956	1173	22.8591	6.1846
23.5858 6.06	56	. 0000		2690.	0585	25.5310	5.7609	000000	24.3409	5.9497
	156	.0865	1 ACO + 2 7	.1846	1067	22.1554	6.2936	. 1173	21.4847	6.4026
		.1104	20.2074	.6051	9160.	19,6019	6.7011	.0634	19.0169	6.7939
18.7317 6.8391		0.000		7 5 5	0000	0.00	36.10		0000	6177
	2 5	2000	10/11/1	9777	00000	6006 · . T	2017.0		70.01	20110
	2	-1305	50.000	3.0048	1141	7086.17	CA 64	0000	01/2:22	7
74.14 TAJT182	D 4	100	22.27.00	02.7	9 4 6 7 7	20.0310	1000		0601.72	8000
5054.0	- X	1305	18.8109	1652	2011	17.9869	5.2125	07.0	17,1784	5.2776
	260	0000			•					
	000	0.000	15.0230	3.5000	0320	16.1290	3.5000	0850	17.2350	3.5007
	000	1510	19.4470	3.5000	1640	20.5540	3.5000	-,1640	21,6600	3.5000
	000	1240	23.8720	3.5000	0850	25.5310	3.5000	0000.0	23.8720	3.5030
	800	.1240	21.6600	3.5000	.1510	20.5540	3.5000	.1640	19.4470	3.2030
	800	.1510	17.2350	3.5000	.1240	16.1290	2.5000	.0850	15,0230	3.5000
14.4700 3.5000	900	0.0000								
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**** COMPONENT-	NING 2	NI - WING 2	NUMBER-	2 *****						
7										
SCALE 0.000	<b>10</b>	000000	0.0000	000000						
<b>&gt;</b>		7	×	>	2	×	>	7	×	۲
		0000	15.0230	1.5000	.0320	15.5760	1.5000	.0600	16.1290	1.5000
		.1060	17.2350	1.5000	.1240	17.7840	1.5000	.1390	18.3410	1.5000
		.1590	19.4470	1.5000	1040	20.0010	7 2000	.1660	20.5540	1.5000
21.1070 1.5000	00	.1590	21.6600	1.5000	1910	22.2130	1.5000	1390	22.7660	1.5003



TABLE IV. - Continued

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# ORIGINAL PAGE IS OF FOOR QUALITY

1111		0.0000	.3057 0.0000 0.0000 1.558 0.0000 1.534 1.534	01 C1 01	01 01 01 000 000 000 000 000 000 000 000
		0.0000 0.0000 0.0000 0.1396 1.2143	. 2443 . 2143 . 3457 . 3450	. 1911 . 1940 . 1960 . 6467 . 6660 . 6560 . 6560	
180 180 180 180 180 180 180 180 180 180		14.4700 14.4700 14.4700 15.2352 15.2000 15.1678	15.8487 15.7436 15.0652 16.5728 16.6769 16.588	17.11.29 17.31.6 17.380.2 17.786.9 17.786.9 17.786.9 17.786.9 17.786.9 11.786.9 18.00.00	.178 .022 .022 .022 .053
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######################################	6.2500	1.6390	0000	0062.9	. 6000	00000	0062.0	6100	00000	0002.0	6000	00000
****** COMPONENT- BRACE ************************************	0063.0	7.69	2000.0									
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15URF 1 IMAGE 0 15URF 1 IMAGE 0 15URGINATES 1 28.7500 -1.5400 -2590 28.7500 1.5000 28.7500 -1.5400 -2590 28.7500 1.5500 29.1000 -1.5600 -2590 29.1000 1.5340 .2590 28.7500 1.5000 29.1000 -1.5600 -2590 29.1000 1.5340 .2590 29.1000 1.5000 29.5000 -1.5800 -2590 29.5000 1.5340 .2590 29.5000 1.5000 29.5000 -1.5800 -2590 29.5000 -1.5540 0.0000 29.5000 1.5000 30.0000 -1.5900 -2590 30.0000 1.5340 .2590 30.0000 1.5000 29.5000 -1.5900 -2590 29.5000 -1.5900 0.0000 29.5000 1.5000 29.5000 -1.5900 -2590 30.0000 1.5340 .2590 30.0000 1.5000 20.0000 -1.5900 -1.5900 -1.5900 -1.5900 1.5000 1.5000	SARGE CONF.	NENT- BRA	IC E	. NUMBER-	8 ***	11						
VARIE TIME A COURT OF	1 SUBTO	IMAGE				*						
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28.7500 -1.5400 -2590 28.7500 1.5340 .2590 28.7500 1.5000 28.7500 -1.5490 -2590 28.7500 -1.5340 .2590 28.7500 1.5900 29.1000 -1.5600 -2590 29.1000 1.5340 .2590 29.1000 1.5900 29.1000 -1.5600 -2590 29.1000 1.5340 .2590 29.1000 1.5000 29.5000 -1.5800 -2590 29.5000 1.5340 .2590 29.5000 1.5000 39.0000 -1.5900 -2590 30.0000 1.5340 .2590 30.0000 1.5000 39.0000 -1.5900 -2590 30.0000 1.5340 .2590 30.0000 1.5000	INPUT COORDINA	ITES										
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28.7500 -1.54902590 28.7500 -1.5550 6.0000 28.7500 -1.5490 29.1000 1.5540 29.1000 1.5540 29.1000 1.5540 29.1000 1.5540 29.1000 1.5540 29.1000 1.5540 29.1000 1.5540 29.1000 1.5540 29.5000 1.5540 29.5000 1.5540 29.5000 1.5540 29.5000 1.5540 29.5000 1.5500 1.5000 1.5500 1.5500 1.5000 1.5500 1.5500 1.5000 1.55	28.7500	-1.5490	.2590		1.5340	.2590	28.7500	1.5000	0000	28.7500	1.5340	2590
29,1000 -1,3500 -2,2590 29,1000 1,5340 5,2590 29,1000 -1,5600 29,1000 1,5340 5,2590 29,1000 -1,5600 29,5000 1,5340 5,2590 29,5000 1,5340 5,2590 29,5000 1,5360 1,53	28.7500	-1.5490	2590		-1.5150	000000	28.7500	-1.5490	. 2540			400
29.1000 -1.5000 -2.590 29.1000 -1.500 0.0000 29.5000 1.5000 29.5000 -1.5000 -1.5000 1.5500 1.5000 1.	29.1000	-1.5600	0662.		2660.1	0607	0007.62	0000		2001.63	1.3340	
29.5000 -1.58002590 29.5000 1.5340 2590 29.5000 -1.5800 30.0000 29.5000 -1.5800 -1.5900 29.5000 1.5900 -1.5900 -1.5900 1.5900	29.1000	0000-1-	0667-		0000	0000	0001.62	0000	0400	20.5000	1.5260	13500
30,0000 -1,5900 -2590 30,0000 -1,6000 0,0000 30,0000 -1,5900 30,0000 -1,5900 -1,5900 -1,5900 0,0000 0,0000 30,0000 -1,5900 0,00000 0,000 0,0000 0,0000 0,000	0006.62	0000.1	04670			0000	29.5000	0000	25.00	2000	2	
30,0000 -1,5900 -2590 30,0000 -1,6000 0,0000 30,0000 -1,5900 -1,5900 0,0000 30,0000 -1,5900 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,00000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000 0,0000	2000	11.1900	24.00		1.5360	200	30,000	1.5000	0000	30.000	1.5340	-,2590
T START	30.000	-1.5900	-,2590	30.000	-1.6000	00000	30.000	-1.5900	. 2590		2	
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TABLE IV .- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 1

MACH NG. ALPHA(DEG) XO ZO NX NTHETA NCON NPR
1.4140 0.0000 0.0000 50 16 0 8

EXIT CASREAD ENTER SLOPE EXIT SLOPE ENTER XMAT EXIT XMAT ENTER ENDPTS EXIT ENDPTS ENTER ADIST EXIT ADIST ENTER OUT





TABLE IV .- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 1

MACH NO. ALPHA(DEG) XO ZO NX NTHETA NCON NPR
1.4140 0.0000 0.0000 0.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA - -90.000

x	WING 1	WING Z	FUS	ELAGE	P00	1	P00	2
			SCAP .	0.000000	SCAP .	0.000000	SCAP .	0.000000
-2.500000	0.00000	0.00000		0.000000		0.000000		0.000000
-1.600000	0.00000	0.00000		0.00000		0.00000		.093757
700000	0.00000	0.000000		0.000000		0.000000		.336260
.200000	0.000000	3.000000		0.000000		0.000000		.682600
1.100000	0.000000	0.000000		0.00000		0.00000		1.085950
2.000000	0.00000	0.00000		0.000000		0.000000		1.496849
2.900000	0.00000	0.000000		0.000000		.018520		1.912535
3.800000	0.000000	0.00000		0.000000		.190056		2.281509
4.700000	0.00000	0.00000		0.000000		,479747		2.600693
5.600000	0.00000	0.00000		0.000000		.855809		2.838158
6.500000	0.000000	0.00000		0.000000		1.267390		2.988640
7.400000	0.000000	0.00000		0.000000		1.683881		3.069549
8.300000	0.000000	0.00000		0.000000		2.078989		3.101241
9.200000	0.000000	0.000000		0.000000		2.436163		3.105872
10.100000	0.00000	0.00000		0.000000		2.712525		3.105872
11.000000	0.000000	0.00000		0.000000		2.915755		3.105872
11.900000	0.000000	0.000000		0.000000		3.034756		3.105872
12.800000	0.000000	0.00000		0.000000		3.088689		3.105872
13.700000	0.000000	0.000000		0.000000		3.105559		3.105872
14.600000	.001538	.001182		.005191		3.105872		3.105872
15.500000	.093612	.073852		.303271		3.105872		3.105872
16.400000	.311491	.245773		.839341		3.105872		3.105872
17.300000	.630032	.408881		1.210654		3.105872		3.105872
18.200000	1.020261	.530941		1.312198		3.105872		3.105877
19.100000	1.446887	•613391		1.316645		3.105872		3.105872
20.003000	1.860575	.654186		1.316646		3.105872		3.105872
20.900000	2.224756	.653830		1.316646		3.105872		3.105872
21.800000	2.496202	.612660		1.316646		3.105872		3.105872
22.700000	2.595915	.529083		1.316646		3.105872		3.105872
23.600000	2.330699	.406364		1.316646		3.101872		3.105872
24.500000	1.619472	.242016		1.316646		3.105872		3.105872
25.400000	.191764	.031012		1.316645		3.105872		3.105872
26.300000	0.00000	0.00000		1.316646		3.105872		3.105559
27.200000	0.000000	0.00000		1.316646		3.105872		3.089547
28.100000	0.000000	0.00000		1.316646		3.105872		3.037329
29.000000	0.00000	3.000000		1.316646		3.105872		2.894936
29.900000	0.00000	0,00000		1.316646		3.105872		2.684865
30.800000	0.000000	0.00000		1.316646		3.105872		2.401544
31.700000	0.000000	0.000000		1.316646		3.101261		2.074276
32.600000	0.000000	0.00000		1.316646		3.072032		1.694764
33.500000	0.000000	0.00000		1.316646		2.983293		1.273768
34.400000	0.000000	0.00000		1.316646		2.812869		.842768
35.300000	0.000000	0.000000		1.316646		2.56530.		.463637
36.200000	0.00000	0.00000		1.316046		2.259653		.187280
37.100000	0.00000	0.000000		1.316646		1.918229		.017836
38.000000	0.00000	0.00000		1.316646		1.510468		0.000000
38.900000	0.000000	0.00000		1.316646		1.081693		0.000000
39.800000	0.00000	0.00000		1.316646		.660382		0.000000
40.700000	0.000000	0.00000		1.316646		.331229		0.000000
41.600000	0.000000	0.00000		1.316646		.090296		0.000000
42.500000	0.00000	0.000000		1.316646		0.000000		0.000000





TABLE IV.- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 1

MACH NO. ALPHAIDEG) XO ZO NX NTHETA NCON NPR
1.4140 0.0000 0.0000 0.0000 50 16 0 8

S(X) FUR EACH COMPONENT AT THETA = -90.000

x	RIGHT CANARD	LEFT CANARD	BR AC E	TOTAL AREA
-2.500000	0.00000	0.00000	0.00000	0.00000
-1.600000	0.00000	0.000000	0.000000	.093757
700000	0.00000	0.000000	0.00000	.336260
.200000	0.00000	J.000000	0.000000	.682600
1.100000	0.00000	0.00000	0.00000	1.085950
2.000000	0.00000	.017813	0.000000	1.514662
2.900000	0.00000	.058398	0.00000	1.989453
3.800000	0.4000000	0.00000	0.000000	2.471565
4.700000	0.000000	0.00000	0.00000	3.080440
5.600000	0.00000	0.000000	0.00000	3.693968
6.500000	.001839	0.000000	0.000000	4.257869
7.400000	.046852	0.000000	0.000000	4.800301
8.300000	.045949	0.000000	0.000000	5.226198
9.200000	0.00000	0.000000	0.000000	5.542035
10.100000	0.00000	0.000000	0.000000	5.818397 6.02162/
11.000000	0.000000	0.00000	0.000000	6.140628
11.900000	0.00000	3.000000	0.00000	6.194561
12.800000	0.000000	0.00000	0.00000	6.211431
13.700000	0.00000	0.000000	0.00000	6.211431
14.600000 15.500000	0.000000 0.000000	0.00000	0.00000	6.682479
16.400000	0.00000	0.00000	0.000000	7.608349
17.300000	0.00000	0.00000	0.000000	8.461312
18.200000	0.00000	0.00000	0.000000	9.07 د 9.07
19.100000	0.00000	0.00000	0.00000	9.586668
20.000000	0.000000	0.00000	0.000000	10.043151
20.900000	0.00000	3.000000	0.00000	10.406976
21.800000	0.000000	0.00000	0.000000	10.637252
22.700000	0.000000	0.000000	0.000000	10.653388
23.600000	0.000000	0.000000	0.00000	10.265453
24.500000	0.00000	0.000000	0.000600	9.380878
25.400000	0.00000	0.00000	0.00000	7.751167
26.300000	0.00000	0.000000	0.00000	7.528077
27.200000	0.00000	0.00000	0.000000	7.512085
28.100000	0.00000	0.00000	0.000000	7.459847
29.000000	0.00000	0.000000	1.559047	8.876501
29.900000	0.00000	0.00000	1.113841	8.221224
30.800000	0.00000	3.000000	0.030000	6.824062
31.700000	0.00000	0.000000	0.00000	6.492134
32.600000	0.00000	0.00000	6.00000	6.083442
33.500000	00000	0.00000	0.000000	5.573707
34.400000	0.00000	0.00000	0.000000	4.972284
35.300000	0.00000	3.00000	0.00000	4.345584
36.200000	0.00000	0.00000	0.00000	3.763579
37.100000	0.00000	0.000000	0.00000	3.252711
38.000000	0.000000	0.00000	0.00000	2.827114
38.900000	0.00000	0.00000	0.00000	2.396339
39.800000	0.00000	0.00000	0.000000	1.977028
40.700000	0.000000	0.00000	0.00000	1.647875
41.600000	0.000000	0.00000	0.000000	1.406942
42.500000	0.000000	0.000000	0.000000	1.316646



TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 1

MACH ND. ALPHA(DEG) XO ZO NX NTHETA NCON NPR
1.4140 0.0000 0.0000 0.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA . 90.000

		SINT ION LAGI	• • • • • • • • • • • • • • • • • • • •	,,,,,,,,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
x	WING 1	WING 2	FUS	ELAGE	POD	1	POD	2
			SCAP =	0.000000	SCAP =	0.000000	SCAP =	0.000000
-2.500000	0.000700	0.00000		0.000000		0.000000		0.000000
-1.600000	0.00C Un	0.00000		0.000000		0.00000		.093757
700000	0.000000	0.00000		0.000000		0.000000		.335174
.200000	0.00000	0.00000		0.000000		0.000000		.685123
1.100000	0.00000	0.00000		0.000000		0.000000		1.081096
2.000000	e.00000	0.000000		0.000000		0.000000		1.501731
2.900000	0.00000	0.00000		0.00000		.018520		1.907551
3.800000	0.00000	0.00000		0.000000		·189751		2.284499
4.700000	0.00000	0.00000		0.000000		.477838		2.598095
5.600000	0.00000	0.00000		0.000000		.857105		2.834448
6.500000	0.00000	0.00000		0.000000		1.271625		2.988400
7 - 400000	0.00000	0.000300		0.000000		1.683922		3.073579
8.300000	0.00000	0.000000		0.000000		2.080012		3.100089
9.200000	0.000000	0.000000		0.000000		2.439501		3.105838
10.100000	0.00000	0.00000		0.000000		2.711742		3.105872
11.000000	0.00000	0.00000		0.000000		2.916558		3.105872
11.900000	0.00000	0.00000		0.000000		3.034408		3.105872
12.800000	0.00000	0.000000		0.000000		3 088050		3.105872
13.700000	0.00000	0.00000		0.000000		3.105291		3.105872
14.600000	.001538	.001182		.005172		3.105872		3.105872
15.500000	.093612	.073852		.305715		3.105872		3.105872
16.400000	• ² " [49]	.245773		.843054		3.105872		3.105972
17.300000	.630032	.406881		1.202976		3.105072		3.10587?
18.200000	1.020261	.530941		1.310605		3.105872		3.105872
19.100000	1.446706	.613391		1.316646		3.105872		3.105872
20.000000	1.860520	.654186		1.316646		3.105872		3.105872
20.900000	2.224953	.653830		1.316646		3.105872		3.105872
21.800000	2.496393	-612660		1.316646		3.105672		3.105872
22.700000	2.596029	.529083		1.316646		3.105872		3.105872
23.600000	2.341270	.406364		1.316646		3.105872		3.105872
24.500000	1.572137	.242016		1.316646		3.105872		3.105872
25.400000	-186059	.031012		1.316646		3.105872		3.105872
26.300000	0.00000	0.000000		1.316646		3.105872		3.105291
27.200000	0.00000	0.000000		1.316646		3.105872		3.088050
28.100000	0.00000	0.000000		1.316646		3.105872		3.039135 2.892704
29.000000	0.00000	0.000000		1.316646		3.105872		
29.900000	0.00000	0.00000		1.316646		3.105872 3.105838		2.678517 2.406296
30.800000	0.00000	0.000000		1.316646				
31.700000	0.00000	0.000000		1.316646		3.100089		2.078775
32.600000	0.00000	0.000000		1.316646		3.074114		1.695085
33.500000	0.00000	0.000000		1.316646		2.983488		1.284143
34.400000	0.00000	0.000000		1.316646		2.805129		.837185
35.300000	0.00000	0.000000		1.316646		2.559409		.461139 .1871#0
36.200000	0.00000	0.000000		1.316646		2.266221		.017834
37.100000	0.000000	3.000000		1.316646		1.917897		0.000000
38.000000	0.000000	0.000000		1,316646		1.085942		0.000000
38.900000 39.800000	0.000000 0.000000	0.000000		1.316646 1.316646		.656312		0.000000
40.700000	0.00000	0.000000				.329735		0.00000^
				1.316646		.090287		0.000000
41.600000 42.500000	0.00000	0.000000		1.316646		0.000000		0.000000
47.200000	0.00000	0.00000		1.316646		V. 000000		0.0000.70





TABLE IV. - Continued

HONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 1

MACH NO. ALPHA(DEG) XG ZO NX NTHETA NCON NPR
1.4140 0.0000 0.0000 50 16 0 6

S(X) FOR EACH COMPONENT AT THETA = 20.000

x	RIGHT CANARD LEFT CANARD BR		BR AC E	TOTAL AREA
~2.500000	0.00000	0.00000	0.000000	0.000000
-1.600000	0.00000	0.00000	0.000000	.093757
750000	0.00000	0.00000	0.000000	. 335104
.200000	0.00000	0.00000	0.000000	.685123
1.100000	0.000000	0.00000	0.000000	1.081096
2.000000	0.00000	.017813	0.000002	1.519544
2.900000	0.00000	• 056095	0.000000	1.982156
3 -800000	0.00000	0.000000	0.000000	2.474750
4.700000	0.00000	3.000000	0.00000	3.075933
5.600000	0.000000	0.00000	0.000000	3.691554
6.500000	.001839	0.00000	0.000000	4.261864
7.400000	• 046852	0.00000	0.000000	4.804234
000 ר 30 א	.045949	0.00000	0.000000	5.226049
9.200.00	0.00000	3.00000	0.000000	5.545338
10.100000	0.000000	0.00000	0.000000	5.81761-
13.000000	0.000000	0.000000	0.000000	6.022430
11.900000	0.00000	0.00000	0.000000	6.140280
12.800000	0.00000	0.000000	0.000000	6.193722
13.700000	0.00000	3.000300	0.000000	6.211163
14.600000	0.000000	0.00000	0.000000	6.219635
15.500000	0.000000	0.00000	0.000000	6.684922
16.400000	0.00000	0.000000	0.00000	7.612062
17.300000	0.00000	0.00000	0.000000	8.453634
18.200000	0.000000	0.00000	0.000000	9.073551
19.100000	0.000000	0.00000	0.000000	9.588488
20.000000	0.00000	0.00000	0.000000	10.043095
20.900000	0.00000	0.00000	0.000000	10.407173
21.800000	0.00000	0.00000	0.000000	10.637443
22.700000	0.000000	0.00000	0.00000	10.653501
23.600000	0.00000	0.00000	0,000000	10.276024
24.500000	0.000000	0.00000	0,000000	9.342543
25.40(000	0.00000	0.00000	0.000000	7.745462
26.300000	0.00000	0.00000	0,000000	7.527809
27.200000	0.00000	0.000000	0.000000	7.510568
28.100000	0.000000	0.00000	0.000000	7.461653
29.000000	0.000000	0.00000	1.559047	6.574270
29.900000	0.00000	0.00000	1.113841	8.214875
30.800000	0.006000	0.00000	0.000003	6.828770
31.700000	0,,000000	0.00000	0.000000	6.495510
32.600000	0.00000	0.00000	0.000000	6.085845
33.500000	0.00000	0.00₩00	0.000000	5.584277
34.400000	0.00000	0.00000	0.030000	4.956961
35.300000	0.00000	0.00000	0.000000	4.337194
36.200000	0.00000	0,00000	0.00000	3.770046
37.100000	0.000000	0.00000	0.000000	3.252378
38.000000	0.00000	0.00000	0.000000	2.833502
38.900000	0.00000	0.00000	0.000000	2.402568
39.800000	0.00000	0.00000	0.00000	1.972958
40.703000	0.00000	0.00000	0.000000	1.646381
41.600000	0.00000	0.000000	0.000000	1.406933
42.500000	0.00000	0.00000	0.000000	1.316646
		· ·	•	





TABLE IV .- Continued

HONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 1

MACH AD. ALPHA(DEG) XD ZO MX MTHETA MCON MPR
1.4140 0.0000 0.0000 0.0000 50 . 0 6

SEX) FOR EACH COMPONENT AT THE. . . 270.000

		S(X) FUR EACH	. URPUNENI	41 Ing 2	,0.000					
x	WING 1	WING 2	FU	SELAGE		POD	1		P00	2
			SCAP =	0.00000	SCAP	•	0.00000	SCAP		0.000000
-2.500000	0.600000	3.00000	'	0.00000			0.00000			0.000000
-1.600000	0.00000	0.00000		0.00000			3.000000			.093757
700000	0.000000	0.00000		0.00000			0.600000			.33626C
.200000	0.00000	0.00000		0.000000			0.000000			•682690
1.100000	0.00000	0.00000		0.00000			0.00000			1.085950
2.000000	0.000000	0.00000		0.000000			0.00000			1.496849
2.900000	0.00000	0.00000		0.00000			. 01 8520			1.912535
3.800000	0.000000	0.000000		0.000000			.190056			2.281509
4.700000	0.00000	0.000000		0.000000			.479747			2.600693
5.600000	0.00000	0.00000		0.000000			.855809			2.836158
6.500000	0.200000	0.00/0000		0.000000			1.267390			2.988640
7.4000C	0.000000	0.00000		0.000000			1.683881			3.06955#
8.300000	0.000000	0.00000		0.03000			2.078989			3.101261
9.200000	0.000000	0.000000		0.000000			2.436163			3.105872
10.100000	0.00000	3.000000		0.000000			2.712525			3.10587?
11.000000	0.00000	0.00000		0.000000			2.915755			3.105877
11.900000	0.00000	0.00000		0.000000			3.034756			3.105872
12.800000	0.00000	0.000000		0.000000			3.098689			3.10587?
13.700000	0.00000	0.00000		0.000000			3.105559			3.105877
14.600000	.001538	.001162		.005191			3.105872			3.105872
15.500000	.093612	073952		.303271			3.105872			3.105872
	.311491	.245773		.039341			3.105872			3.105872
16.499000 17.300000	.630032	.408881		1.210654			3.105672			3.105877
18.200000	1.020261	.530941		1.312198			3.105872			3.105872
19.100000	1.446857	.613391		1.316646			3.105872			3.105872
•	1.660575	.654186		1.316646			3.105872			3.105872
20.000000	2.224756	.653830		1.31 646			3.105872			3.105877
20.900000	2.496202	.612660		1.316646			3.105872			3.105872
21.800030	2.595915	.529083		1.316646			3.105872			3.10567?
22.700000	2.330699	.406364		1.316646			3.105672			3.105672
23.600000	1.610472	.242016		1.316646			3.105872			3.105872
24.500000	.191754	.031012		1.316646			3.105672			3.105877
25.400000	0.00000	0.00000		1.316646			3.105872			3.105559
26.700000	0.00000	0.000000		1.316646			3.105872			3.089567
27.200000	0.00000	3.000000		1.316646			3.105872			3.037329
28.100000	0.00000	0.000000		1.316646			3.105872			2.894936
29.000000		0.00000		1.316646			3.105672			2.684865
29.90000	0.000000 0.000000	0.000000		1.316646			3.105872			2.401544
30 - 800000		0.00000		1.316640			3.101261			2.074276
31.700000	0.00000	0.00000		1.316646			3.072032			1.694754
32.600000	0.000000	0.00000		1.316646			2.983293			1.273768
33.500000	0.000600	0.00000		1.316646			2.812869			.842768
34.400000	0.00000	0.00000		1.316646			2.565301			463637
35.300000	0.000000	0.000000		1.316646			2.259653			.1872PO
36.200000	0.00000	0.00000		1.316646			1.918229			.017836
37.120000	0.000000	0.00000		1.316645			1.510463			0.000000
38.000000	0.00000	0.00000		1.310646			1.081673			0.000000
38.900000	0.00000	0.00000		1.316646			.660382			0.000000
39.800000	0.000000			1.316646			.331229			0.000000
40.700000	0.000000	0.00000		1.316646			.090296			0.00000
41.600000	0.00000	0.000000		1.316646			0.000000			0.000000
42.500000	0.00000	0.00000		1.310040			3,000.00			



TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY DEDMETRY SAMPLE

CASE C'IECK 1
MACH NO. ALPHA(DEG) XG ZO NX NTHETA NCON NPR
1-4140 0.0000 0.0000 50 16 0 8

SIX) FOR EACH COMPONENT AT THETA . 2 '0.000

x	RIGHT CANARD	LEFT CAMARD	BRACE	TOTAL AREA
-2.500000	0.00000	0.000000	0.00000	0.00000
~1.600000	0.00000	0.000000	6.00000	.093757
700000	0.700060	0.00000	0.000000	.336260
.200000	0.000000	0.000000	0.00000	.682600
1.100000	J.000000	J.00000	0.00000	1.085750
2.000000	0.00000	.017813	0.00000	1.514662
2.900000	0.00000	.058398	0.00000	1.989453
3.800000	Q. 00 0 000	0 000000	0.00000	2.47156>
4.700000	0.20000	0.000000	0.00000	3.080440
5.600000	0.60000	0.00000	0.00000	3.693968
6.500000	.001639	0.00000	0.00000	4.257869
7-400000	.046852	0.00000	0.00000	4.800301
8.300000	.045949	0.00000	0.030000	5.226198
9.200000	0.00000	J.00000	0.000000	5.542035
10.100000	0.00000	C.000000	0.000000	5.818397
11.000000	0.00000	0.000000	0.00000	6.021627
11.900000	0.00000	0.00000	0.00000	6.140628
12.800000	0.00000	0.00000	0.00000	6.194561
13.700000	0.00000	0.000000	0.030600	6.211431
14.600000	0.00000	0.00000	9.000000	6.219654
15.500000	0.00000	0.00000	0.00000	6.682479
16.400000	0.000010	3.00000	0.000000	7.608349
17.300000	0.00000	0.000000	0.000000	8.461312
18.200000	0.000000	3.000000	0.000000	9.075144
19.100000 20.000000	0.000000	3.000030	0.00000	9.588668
20.000000	0.000000	0.000300	0.000000	10.043151
21.808000	0.000000 0.000000	0.00000)	0.000000	10.406976
22.700000	0.00000	0.00000	0.000000	10.637252
23.600000	0.00000	0.00000	0.00000	10.653388
24.500000	0.00000	3.00000	0.000000	10.265453 9.380878
23.400000	0.000000	0.00000	0.00000	7.751167
26.300000	0.00000	0.000000	0.000000	7.528077
27.200000	0.00000	0.000000	0.000000	7.512085
28.100000	0.00000	2.000000	0.00000	7.459847
29.000000	0.000000	9.00000	1.559047	8.876501
29.900000	0.00000	0.300300	1.113841	8.221224
30.800006	0.00000	0.00000	0.00000	6.824062
31.700000	0.00000	0.00000	0.000007	6.492134
32.600000	0.00000	0.000000	0.000000	6.083442
33.500000	0.000000	0.000000	0.000000	5.573707
34.400000	0.000000	0.00000	C.000000	4.972284
35.300000	0.00000	0.00000	0.000000	4.345584
36.200000	0.000000	0.00000	0.000000	3.763579
37.100000	0.000000	0.00000	0.00000	3.252711
38.000000	0.00000	0.00000	0.000000	2.027114
38.900000	0.006000	0.000000	0.000000	2.398339
39.800000	0.00000	3.00000	0.00000	1,977028
40.770000	0.00000	3.000000	0.00000	1.647875
41.600000	3.00000	0.00000	0.000000	1.406942
42.500000	0.00000	0.000000	0.00000	1.316646

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TABLE IV .- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

MACH NO. 1.4140	ALPHA(DEG) 0.0000	CASE XD 0.0000	0.0000	N X 50	NTHETA 16	NCON O	N P
	D/9 AS:	STALDE	alth VAR	IOUS V	ALUES OF	THETA	
	N		THETA			0/9	
	0		-90.000		6	.01409	
	1		-67.500		4	.46527	
	2		-45.000		a	.60781	
	3		-22.500		1	.80310	
	1 2 3 4 5		0.000		1	.82-56	
	5		22.500		1	.81127	
	6		45.000		ž	.61164	
	7 8 9		67.500		4	.52150	
	8		90.000		7	.89783	
	9		112.500			.38009	
	10		135.000		2	-08889	
	11		157.50C		ī	,15584	
	12		100.000		1	.15471	
	13		202.500		1	.15050	
	14		225.000		Z	.07327	
	15		247.500		4	.39572	
	16		270.000		6	-01409	

D/Q = 3.15263 = .31526293E+01 CDW = .01425 = .142511045-01

EXIT OUT

SUCCESS STOP REACHED.

ENTER CASREAD

(4,

ORIGINAL PAGE IS OF POOR QUALITY.

TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK Z

MACH ND. ALPHA(DEG) XD ZO NX NTHETA NCON HPR
1.4140 2.0000 0.0000 0.0000 50 16 0 8

EXIT CASREAD ENTER SLOPE

(1)

TABLE IV .- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

				CASE	CHECK 2					
		MACH NO.	ALPHA (DEG)		20	MX	NTHETA	NCUN	hPR .	
		1.4140	2.0000	0.0000	0.0000	50	16	0	8	

FUSELAGE										
***** #004	SLUPE ERROR	*****								
X1	71	Z1	PHE		42	Y2		72	PH12	THETA
14.46119	0.00000	50500	0.000		. 24294	. 050	. 00	31086	170.86258	-90.000
14.46119	0.00000	50500	0.000		. 23872	. 097		32842	163.41721	-90.000
14.46119	0.00000	50500	0.000	00 15	.23872	. 097	80 -	32842	163.41721	67.500
14.46119	0.0000	50500	0.000		. 23203	. 139		35661	158.62131	-90.000
14.46119	0.0000	50500	0.000		. 23203	.139		35661	158.62131	-67.500
14.46119	0.00000	50500	0.000	00 15	.22335	. 173	60 -	39323	156.17972	-90.000
14.46119	0.00000	50500	0.000		. 22335	. 173		39323	156.17972	-67.500
14.46119	0.00000	50500	0.000		.21315	.198		43610	155.58064	-90.000
14.46119	0.00000	50500	0.000	00 15	. 21315	.198	100	.43610	155.58064	-67.500
14.46119	0.0000	50500	0.000		.21315	. 198		43510	155.58064	-45.000
14.46119	0.00000	50500	0.000	00 15	.20200	. 211	.60	48304	156.34360	-90.000
14.46119	0.00000	50500	0.000	00 15	. 20200	. 211	60 -	-48304	156.34360	-67.500
14.46119	0.00000	-, 50500	0.000	00 15	.20200	. 211	60	48304	156.34360	-45.000
14.46119	0.00000	50500	0.000	90 15	.19074	.214	30 -	53047	158.00230	-90.000
14.46119	0.00000	50500	0.000	00 15	.19074	.214	30 -	53047	158.00230	-67.560
14.46119	0.00000	59500	0.000	00 15	.19074	.214	30 -	53047	158.00230	-45.300
14.46119	0.00000	50500	0,000	00 15	.17972	. 206	40 -	57672	160.30830	-90.000
14.46119	0.00000	50500	0.000		.17972	. 206	40	57672	160.30830	-67.500
14.46119	0.00000	50500	0.000	00 15	.17972	. 206	40	57672	160.30830	-45.000
14.46119	0.00000	50500	0.000	00 15	.16939	.108	150 -	62028	163.09629	-90.000
14.46119	0.00000	50500	0.000	00 15	-16939	.188	150 -	62028	163.09629	-67.500
14.46119	0.0000	56500	0.000	00 15	.16939	.188	50 -	62028	163.09629	~45.000
14.46119	0.00000	50500	0.000	00 15	. 16036	. 161	.60 -	65829	106.20751	-90.000
14.46119	0.00000	50500	0.000		.16036	. 161		65829	166.20751	-67.500
14.46119	0.00000	50500	0.000		.16036	.161	60	65829	166.20751	-45.000
14.46119	0.0000	50500	0.000		.15297	.127		68945	169.50660	-70.000
14.46119	0.00000	50500	0.000		. 15297	. 127		68945	169.50660	-67.500
14.46119	0.0000	50500	0.000		.15297	. 127		68945	169.50660	-45.000
14.46119	0.0000	~.50500	0.000	00 15	. 14745	. 086		71277	172.94596	-90.000
14.46119	0.0000	50500	0.000		. 14745	.088		71277	172.94596	-67.500
14.46119	0.00000	~.50500	0.000		. 14745	.086		71277	172.94596	-45.000
14.46119	0.0000	~.50500	0.000		-14405	. 044		~.72696	176.48139	-90.000
14.46119	0.0000	~. 50500	0.000		.14405	. 044	70	-,72696	176.48139	-67.500
14.46119	0.00000	50500	0.000	00 15	. 14405	. 044	70	~.72696	176.48139	-45.000
EXIT SLOPE										
ENTER EMOPTS										
EXIT ENOPTS										
ENTER ADIST										
EXIT ADIST										
ENTER OUT										

43



TABLE IV .- Continued

MONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 2

MACH NO. ALPHA(DEG) XO ZO NA NTHETA NCON NPI
1.4140 2.0000 0.0000 0.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA - -90.000

		3177 108 246							_
x	WING 1	AINE 5	FU!	SELAGE	POD	1		P0 0	2
			SCAP -	0.000000	SCAP .	0.000000	SCAP	•	0.000000
-2.411255	0.00000	0.00000		0.000000		0.00000			0.000010
-1.543203	0.00000	0.000000		0.00000		0.000000			.098004
675151	0.00000	3.000000		0.000000		0.00000			.350645
.192900	0.00000	0.00000		0.000000		0.00000			.710119
1.060952	0.00000	0.00000		0.000000		0.00000			1.129511
1.929004	0.00000	0.00000		0.000000		0.00000			1.554026
2.797055	0.00000	0.000000		0.00000		.019359			1.984748
3.665107	0.00000	0.000000		0.000000		.198070			2.365444
4.533159	0.00000	0.00000		0.000000		.500281			2.694035
5.401210	0.00000	0.00000		0.000000		.890054			2.938526
6.269262	0.00000	0.000300		0.000000		1.316338			3.095774
7.137314	0.00000	0.00000		0.000000		1.748242			3.100196
8.005366	0.00000	0.000000		0.030000		2.156026			3.214423
8.873417	6.00000	0.00000		0.000000		2.523439			3.220192
9.741469	0.00000	0.00000		0.000000		2.810728			3.220192
10.609521	0.00000	0.000000		0.000000		3.019320			3.2201*2
11.477572	0.00000	0.00000		0.00000		3.142883			3.2201*?
12.345624	0.00000	0.00000		0.00000		3.200287			3.220102
13.213676	0.000000	0.00000		0.000000		3.219306			3.220197
14.081727	.001595	-001226		.005498		3.220182			3.220192
14.949779	.097093	.076502		.318796		3.220182			3.220192
15.817831	.323033	.254890		.872665		3.220162			3.220192
16.685882	.653325	.423987		1.249438		3.220182			3.220182
17.553934	1.057922	.550493		1.360116		3.220102			3.220172
18.421986	1.500166	.635890		1.365105		3.220182			3.220192
19.290037	1.928958	.678170		1.365105		3.220182			3.2201-2
20.158089	2.306445	.677814		1.365105		3.220162			3.2201-2
21.026141	2.587803	.635105		1.365105		3.220182			3.220197
21.894192	2.691338	.548518		1.365105		3.220182			3.2201*7
22.762244	2.416389	.421368		1.365105		3.220182			3.220192
23.630296	1.671768	.251024		1.365105		3.220182			3.220192
24.498348	.199166	.032171		1.346300		3.220162			3.220192
25.366399	0.00000	0.00000		1.315844		3.220182			3.219396
26.234451	0.00000	0.000000		1.315844		3.220162			3.201471
27.102503	0.00000	0.000000		1.345844		3.220162			3.144645
27.970>54	0.00000	0.00000		1.315844		3.220182			2.99702
28.838606	0.00000	0.000000		1.315844		3.220162			2.78401 <i>7</i> 2.489052
29.706658	0.00000	0.000000		1.315844		3.220165			2.150019
30.574709	0.00000	3.000000		1.315844		3.214423			
31.442761	0.00000	0.000000		1.315844		3.163018			1.759833
32,310813	0.00000	J.000000		1.315844		3.688722			1.322273
33.176664	0, 30,000	J.000J0J		1.315844		2.912720			.878304 .483164
34.046916	0.00000	0.000000		1.315844		2.661616			
34.914968	0.00000	0.000000		1.315844		2.341531			.195212
35.783019	0.000300	0.00000		1.315844		1.988734			.018639
36.651071	0.00000	0.00000		1.315844		1.567720			
37.519123	0.00000	ა. 000 ე00		1.315844		1.124204			J.00030C
36,387174	0.00000	0.000300		1.315844		.688216			0.000000
39.255226	0.00000	0.000000		1.315844		. 345168			0.000000
40.123278	0.00000	0.00000		1.315844		.094359			0.000000
40.991329	0.00000	0.000000		1.315844		0.000000			0.000000

TABLE IV .- Continued

MONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 2

MACH NO. ALPHA(DEG) XO ZO NX NTHETA NCON NPR
1.4140 2.0000 0.0000 0.0000 50 16 0 8

SEX) FOR EACH COMPONENT AT THETA . -90.000

		S(X) FOR EACH CUM	000	
x	RIGHT CAMARD	LEFT CANAKD	BRACE	TOTAL APEA
-2.411255	0.000000	J.000000	0.00000	0.000000
-1.543203	0.00000	0.00000	0.000000	.098004
675151	0.00000	0.00000	0.00000	.350645
.192900	0.00000	0.00000	0.00000	.710119
1.060952	0.000000	0.00000	0.00000	1.129511
1.929004	0.00000	.018539	0.000000	1.572565
2.797055	0.00000	.060632	0.000000	2.064779
3.665107	0.00000	0.00000	0.00000	2.563514
4.533159	0.00000	0.00000	0.00000	3.194316
5.401210	0.00000	0.00000	0.00000	3.828562
6.269262	.001903	0.060000	0.00000	4.414015
7.137314	.089211	0.00000	0.00000	5.017638
8.005366	.047565	0.00000	0.000000	5.418015
8.873417	0.00000	0.00000	0.000000	5.743622
9.741469	0.00000	0.00000	0.00000	6.030911
10.609521	0.00000	0.00000	0.00000	6.239503
11.477572	2.00000	0.00000	0.00000	6.363065
12.345624	0.00000	0.00000	0.00000	6.420469
13.213676	0.00000	0.00000	0.00000	6.439569
14.081727	0.00000	0.000000	0.00000	6.448683
14.949779	0.00000	0.00000	0.00000	6.932856
15.817031	0.00000	0.00000	0.00000	7.890953
16.685882	0.00000	0.00000	0.00000	8.767115
17.553934	0.000000	0.000000	0.00000	9.408895
18.421986	0.00000	J.00000	0.000000	9.941525
19.290037	0.00000	0.00000	0.000000	10.412598
20.158089	0.000000	0.00000	0.00000	10.789729
21.026141	0.00000	0.00000	0.00000	11.028373
21.894192	0.00000	0.00000	0.00000	11.045326
22.762244	0.000000	0.00000	0.00000	10.643227
23.630296	0.00000	0.00000	0.00000	9.728261
24.498348	0.00000	0.00000	0.00000	8.018001
25.366399	0.00000	0.00000	0.000000	7.755413
26.234451	0.00000	0.00000	0.000000	7.737497
27.102503	0.00000	0.00000	0.000000	7.680671
27.970554	0.000000	0.00000	1.562540	9.055594
28.838606	0.000000	0.00000	1.133060	8.453099
29.706658	0.00000	0.00000	0.000000	7.025089
30.574709	0.000000	0.00000	0.000000	6.680306
31.442761	0.00000	0.00000	0.000000	6.258696
32.310813	0.000000	0.000000	0.000000	5.726789
33.178864	0.000000	0.000000	0.000000	5.106868
34.046916	0.000000	0.000000	0.00000	4.460624
34.914968	0.000000	0.00000	0.00000	3.852586
35.783019	0.00000	0.00000	0.00000	3.323217
36.651071	0.000000	0.000000	0.000000	2.883564
37.519123 38.387174	0.000000	0.00000	0.000000 0.000000	2.440048 2.004060

39.255226 40.123278	0.000000 0.000000	0.00000	0.00000	1.661012
		0.00000	0.00000	
40.991329	0.00000	0.00000	0.00000	1.315844





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TABLE IV.- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 2
MACH NO. ALPHA(DEG) XO 20 MX MTHETA NCOM NPR
1.4140 2.0000 0.0000 0.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA . 90.000

x	WING 1	WING 2	FU	SELAGE	POD	1		POD	z
			SCAP -	0.00000	SCAP =	0.000000	SCAP	•	6.000000
-2.585699	0.00000	0.00000		0.000000		0.00000			J.000000
-1.654848	0.00000	0.00000		0:000000		0.000000			•090012
723996	0.00000	0.000 00		0.000000		0.000000			.322467
.206856	0.00000	0.00000		0.000000		0.00000			.660614
1.137708	0.000000	0.00000		0.000000		0.00000			1.042157
2.068560	0.00000	0.00000		0.000000		0.00000			1.450856
2.999411	0.00000	0.00000		0.000000		.017780			1.841453
3.930263	0.00000	0.00000		0.00000		.182686			2.209951
4.861115	0.00000	0.000000		0.000000		.459827			2.513237
5.791967	0.00000	0.00000		0.000000		.826748			2.743591
6.722819	0.00000	0.00000		0.000000		1.227463			2.891949
7.653670	0.00000	0.00000		0.000000		1.626076			2.973729
8.584522	0.00000	0.00000		0.000000		2.010919			2.998323
9.515374	0.00000	0.00000		0.000000		2.360169			3.002913
10.446226	0.00000	0.00000		0.000000		2.623041			3.002937
11.377078	0.000000	0.00000		0.000000		2.821883			3.002932
12.307929	0.000000	0.000000		0.00000		2.936985			3.002932
13.238781	0.00000	0.00000		0.000000		2.986959			3.002932
14.169633	0.000000	0.00000		0.000000		3.002561			3.002932
15.100485	.001486	.001142		.004911		3.002932			3.002932
16.031337 16.962188	.090480 .301104	.071379 .237569		.291673 .812814		3.002932			3.002732
17.893040	.609065	.395283		1.167732		3.002932			3.002932
16.823892	.986353	·513333		1.267929		3.002932			3.002932
19.754744	1.398747	.593124		1.273008		3.002932			3.002932
20.685596	1.798935	•632578		1.273000		3.002932			3.002932
21.616447	2.151353	.632223		1.273008		3.002932			3.002932
22.547299	2.413865	.592443		1.273008		3.002932			3.002932
23.47815	2.510075	.511583		1.273008		3.002932			3.002932
24.409003	2.263085	.392861		1.273008		3.002932			3.002932
25.339855	1.520945	.233912		1.273008		3.002932			3.002937
26.270706	.179982	.029971		1.288600		3.002932			3.002937
27.201558	0.00000	0.00000		1.315844		3.002932			3.002561
28.132410	0.00000	0.00000		1.315844		3.002932			2.986959
29.063262	0.00000	0.00000		1.315844		3.002932			2.942379
29.994114	0.00000	0.00000		1.315844		3.002932			2.800599
30.924966	0.00000	0.000000		1.315844		3.002932			2.589856
31.855817	0.000000	0.00000		1.315844		3.002913			2.327495
32.786669	0.00000	0.00000		1.31>844		2.998323			2.010733
33.717521	0.00000	0.00000		1.315844		2.973865			1.637022
34.648373	0.00000	0.00000		1.315844		2.886838			1.239645
35.579225	0.007000	0.00000		1.315844		2.714761			.806199
36.510076	0.00000	0.00000		1.315844		2.473424			.444053
37.440928	0.00000	0.00000		1.315844		2.192682			.180117
38.371780	0.00000	0.00000		1.315844		1.852837			.017127
39.302632	0.00000	0.00000		1.315844		1.464891			0.00000
40.233484	0.00000	0.00000		1.315844		1.047774			0.000000
41.164335	0.00000	0.00000		1.315844		.632011			0.000000
42.095187	0.00000	0.00000		1.315844		. 31 7504			0.000000
43.026039	0.00000	0.00000		1.315844		.086703			0.000000
43.956891	0.00000	0.00000		1.315844		0.00000			0.000000



TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 2
MACH NO. ALPHA(DEG) XO ZO NX NTHETA NCON NPR
1.4140 2.0000 0.0000 0.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA . 90.000

x	RIGHT CANARD	LEFT CANARD	SRACE	TOTAL AREA
-2.585699	0.00000	0.00000	0.000000	0.000000
-1.654848	0.00000	0.00000	0.000000	.090012
723996	0.00000	0.00000	0.000000	.322467
.206856	0.00000	0.00000	0.00000	.660614
1.137708	0.00000	0.00000	0.00000	1.042157
2.068560	0.00000	.017163	0.000000	1.468019
2.999411	0.00000	.054314	0.000000	1.913547
3.930263	0.00000	0.00000	0.000000	2.392637
4.861115	0.00000	0.00000	0.000000	2.973064
5.791967	0.00000	0.06000	0.000000	3.570339
6.722819	.001781	0.00000	0.00000	4.121193
7.653670	.045383	0.00000	0.000000	4.645188
8.584522	.044491	0.00000	0.000000	5.053733
9.515374	0.00000	0.00000	0.000000	5.363062
10.446226	0.000000	0.00000	0.00000	5.626774
11.377078	0.00000	0.00000	0.00000	5.824815
12.307929	0.00000	0.00000	0.000000	5.939917
13.238781	0.00000	0.00000	0.000000	5.989891
14.169633	0.000000	0.00000	0.000000	6.005493
15.100485	0.00000	0.00000	0.000000	6.013403
16.031337	0.00000	0.00000	0.000000	6.459396
16.962188	0.00000	0.00000	0.000000	7.357351
17.893040	0.000000	0.00000	0.00000	8.177945
18.823892	0.00000	0.00000	0.000000	8.773480
19.754744	0.00000	0.00000	0.000000	9.270743
20.685596	0.00000	0.00000	0.00000	9.710385
21.616447	0.00000	0.00000	0.000000	10.062448
22.547299	0.00000	0.00000	0.000000	10.285181
23.478151	0.00000	0.000000	0.00 C ~00	10.300530
24.409003	0.00000	0.00000	0.000000	9.934818
25.339855	0.00000	0.00000	0.00000	9.033730
26.270706	0.00000	0.00000	0.00000	7.504417
27.201558	0.00000	0.00000	0.00000	7.321337
28.132410	0.00000	0.00000	0.000000	7.305735
29.063262	0.00000	0.00000	0.000000	7.261105
29.994114	0.00000	0.00000	1.533961	8.653336
30.924766	0.000000	0.00000	1.098697	8.0 7330
31.855817	0.00000	0.00000	0.00000	6.646252
32.786669	0.00000	0.00000	0.00000	6.324900
33.717521	0.00000	0.00000	0.000000	5.926731
34.648373	0.00000	0.00000	0.00000	5.444327
35.579225	0.00000	0.00000	0.00000	4.836805
36.510076	0.00000	0.00000	0.00000	4.233320
37.440928	0.00000	0.00000	0.00000	3.688642
38.371780	0.00000	0.00000	0.00000	3.185807
39.302632	0.00000	0.00000	0.00000	2.780735
40.233484	0.00000	0.00000	0.000000	2.363618
41.164335	0.00000	0.00000	0.00000	1.947855
42.095187	0.00000	0.00000	0.000000	1.633352
43.026039	0.00000	0.00000	0.000000	1.402547
43.956891	0.000000	0.000000	0.000000	1.315844



TABLE IV.- Continued

MONSYMMETRICAL THIN BODY GEOMETRY SAMPLE

MACH NO. ALPHAIDEG) XO ZO NX NTHETA NCON NPR

S(X) FOR EACH COMPONENT AT THETA . 270.000

X		THE TON EMEN	COMPONENT AT THETA . 2		
	WING 1	WING Z	111214 4 5	70.000	
		4146 5	FUSELAGE		
-2.411255			OSELAGE	POD 1	
-1.543203	0.00000		SCAP . C. GGODGO		POD 2
- 475103	0.00000	0.000000	V• UU U U U U U	SCAP . D. GGDDD	
675151	Q . 000000	0.00000	0.000000	***************************************	SCAP - 0.000000
•192900	0.00000	0.000000	0.000000	0.00000	
1.060952	0.000000	3.000000	0.00000	0.00000	0.000000
1.929004	0.00000	0.000000	0.000000	0.00000	-098014
2.797055	0.000000		0.000000	0.000000	• 350645
3.665107	0.00000	0.000000	0.000000	0.000000	.710119
4.533159	0.00000	0.000000	0.000000	0.000000	1.129511
5.401210	0.00000	0.000000	0.020000	.019359	1.554026
6.269262	0.00000	0.00000	0.030000	198070	1.984798
7.137314	0.00000	0.000000	0.000000	•500281	2.365444
8.005366	0.00000	0.00000	0.000000		2.694035
8.873417	0.00000	0.00000	0.000000	.890054	2.938528
0.8/3417	0.00000	0.000000	0.00000	1.316338	3.095774
9.741469	0.00000	0.000000	0.00000	1.748242	3 10000
10.609521	0.000000	0.000000	0.000000	2.156026	3.180196
11.477572	0.000000	0.000000	0.000000	2.523439	3.214423
12.345624	0.00000	2.000000	0.000000	2.810728	3.220192
13.213676	0.00000		0.000000	3.019320	3.220192
14.031727	0.00000	0.000000	0.000000	3.142883	3.220147
14.949770	-001595	0.000000	0.000000	3.200287	3.220182
15.817831	•097093	•001226	0000000	3.219386	3.220145
16.685882	• 323033	• 076602	.005498	3.220182	3.220192
17.553934	-653325	• 254890	• 31 8796	3.220182	3.220182
18.421986	1.057922	•423987	· 872665	3.220182	3.220182
19.290037	1.500166	• 550493	1.249438	3.220182	3.220182
20.158089	1.928958	•63>890	1.360116	3.220162	3.220182
21.031089	2.306445	•678170	1.365105	3.220182	3.220105
21.026141	2.587803	.677814	1.365105	3.220182	3.220187
21.894192	2 401222	•635105	1.365105	3.220182	3.220142
22.762244	2.691339	-548518	1.365105	3.220192	3.220182
23.630296	2.416389	• 421368	1.365105	3.220182	3.550185
24.498348	1.671768	******	1.365105	3.220182	3.220142
25.366399	•199166	.251024	1.365105	3.220182	3.2201 #2
26.234451	0.000000	.032171	1.346300	3.220182	3.2201 A >
27.102503	0.000000	0.00000	1.315844	3.220182	3.220192
27.970554	0.000000	0.000000	1 2150	3.220182	3.220192
26.838606	0.00000	0.000000	1.315844	3.220182	3.2193*6
29.706658	0.000000	0.000000	1.315844	3.220182	3.201471
30.574709	0.00000	0.00000	1.315644		3.144645
31.442761	0.000000	0.000000	1.315844	3.220182	2.99702A
32.310013	0.000000	0.00000	1. 315844	3.220162	2.784012
32,310813	0.00000	0.000000	1.315844	3.220182	2 440045
33.178864	0.00000	0.000000	1.315844	3.214423	2.449042
34.046916	0.000000	0.00000	1.315844	3.183018	2.150030
34.914968	0.000000	0.000000	1.315844	3.083722	1.759833
35.783019	0.00000	0.000000	1.315844	2.912720	1.322223
36.651071	0.000000	0.00000	1.315844	2.661616	• 878304
37.519123	0.000000	0.000000	1.315844	2.341531	• 483164
38.387174	0.000000	0.000000	1.315844	1.988734	.195212
39.255226	9.000000	0.000000	1.31604	1.567720	•018639
40.123278	0.000000	0.00000	1.315844	1.124204	0.000000
40.991329	0.000000	0.000000	1.315844		0.000000
	0.000000	0.000000	1.315844	.686216	0.000000
		0.00000	1.315844	. 345168	0.000000
		- -	1.315844	.094359	0.000000
				0.000000	A AAAAA
					0.000000



TABLE IV .- Continued

NONSYMMETRICAL TWIN BODY GEDMETRY SAMPLE

CASE CHECK 2

MACH NO. ALPHA(DEG) XO ZO NX NTHETA NCON NPR

1.4140 2.0000 0.0000 0.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA = 270.000

x	RIGHT CANARD	LEFT CANARD	BRACE	ASSA JATET
-2.411255	0.00000	0.00000	0.000000	0.00000
-1.543203	0.00000	0.00000	0.00000	.078004
675151	0.000000	0.000000	0.000000	.350645
.192900	0.00000	0.00000	0.00000	.710119
1.060952	0.00000	0.000000	0.00000	1.129511
1.929004	0.00000	.018539	0.00000	1.572565
2.797055	0.00000	.060632	0.000000	2.064779
3.665107	0.00000	0.000000	0.00000	2.563514
4.533159	0.00000	0.000000	0.00000	3.194316
5.401210	0.00000	0.000000	6.00000	3.828582
6.269262	.001903	0.000000	0.000000	4.414015
7.137314	.089211	0.000000	0.000000	5.017638
8.005366	.047565	0.00000	0.000000	5.418015
8.873417	0.00000	0.000000	0.000000	5.743622
9.741469	0.00000	0.00000	0.000000	6.030911
10.609521	0.000000	3.060000	0.000000	6.239503 6.363065
11.477572	0.00000	0.000000	0.000000	6.420469
12.345624	0.00000	0.000000	0.000000	6.439569
13.213676	0.000000	0.00000 0.000330	0.030000	6.448683
14.081727	0.000000	0.000000	0.000000	6.932356
14.949779	0.000000		0.000000	7.890953
15.817831	0.000000	0.00000	0.000000	8.767115
16.685882	0.000000	0.000000	0.000000	9.408895
17.553934 18.421986	0.00000	0.000000	^.000000	9.941525
19.290037	0.00000	0.00000	0.000000	10.412598
20.158089	0.000000	3.00000	0.00000	10.789729
21.026141	0.00000	0.00000	0.00000	13.026378
21.020141	0.00000	0.00000	0.000000	11.045326
22.762244	0.000000	0.00000	0.000000	10.643227
23.630296	0.00000	0.000000	0.000000	9.726261
24.498348	0.000000	0.00000	0.000000	8.016001
25.366399	0.00000	0.060000	0.000000	7.755413
26.234451	0.00000	0.00000	0.000000	7.737497
27.102503	0.00000	0.00000	0.00000	7.680671
27.970554	0,00000	0.00000	1.562540	9.095594
28.838606	0.000000	0.00000	1.133060	8.453099
29.706658	0.000000	0.00000	0.00000	7.025089
30.574709	0.00000	0.00000	0.000000	6.680306
31.442761	0.00000	0.00000	0.00000	6.258696
32.310813	0.00000	0.00000	0.00000	5.726789
33.178864	0.00000	0.00000	0.000000	5.106868
34.046916	0.00000	0.00000	0.00000	4.460624
34.914968	0.00000	0.00000	0.00000	3.852566
35.783019	0.00000	0.00000	0.00000	3.323217
36.651071	0.00000	0.00000	0.000003	2.883564
37.519123	0.00000	0.00000	0.00000	2.440048
38.387174	0.00000	0.00000	0.00000	2.004060
39.255226	0.00000	0.00000	0.00000	1.661012
40.123278	0.00000	0.00000	0.00000	1.410203
40.991329	0.00000	0.00000	0.00000	1.315644





OF POOR QUALITY

TABLE IV. - Continued

NONSYMMETRICAL THIN BODY GEOMETRY SAMPLE

MACH NO. 1.4140	ALPHA(DEG) 2.0000	CASE CHECK XD Z(0.0000 0.00	D NX	NTHETA 16	NC ON	NPR B
	D/Q AS	SOCIATED WITH	VARIOUS V	ALUES OF	THETA	
	N	THET	1		D/Q	
	0	-90.0	ንሮ	8	. 14298	
	1	-67.50	00	4	.74100	
	0 1 2 3 4	-45.0	00	2	.72934	
	3	-22.50	00	1	.90443	
	4	0.0			.82910	
	5	22.5			.73194	
	6	45.0			. 45239	
	6 7	67.50			. 28751	
	ė	y0.0			.04826	
	ÿ	112.50			.20001	
	10	135.00			.99596	
	11	157.50			.10900	
	12	180.00			.16545	
	13					
		272.50			.20942	
	14	225 00			.16458	
	15	247.50			.57042	
	16	270.00	10	8	.94298	

D/Q = 3.16119 = .31611894E+01 CDW = .01429 = .14289799E=01

EXIT OUT

BODY SLOPE EQUALS OR EXCEEDS MACH ANGLE. ANY SIMILARITY BETWEEN THE COMPUTED DRAG AND THE CORRECT VALUE IS PURELY COINCIDENTAL.

ENTER CASREAD



TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY GERMETRY SAMPLE

CASE CHECK 3

MACH NO. ALPHA(DEG) XO 40 NX NTHETA NCON NPR
1.4140 2.0000 20.0000 -1.0000 50 16 0 8

EXIT CASREAD ENTER SLOPE EXIT SLOPE ENTER ENOPTS ENTER ADIST EXIT ADIST ENTER OUT

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TABLE IV.- Continued

NONSYMMETRICAL THIN BODY GEOMETRY SAMPLE

CASE CHECK 3

MACH NO. ALPHA(DEG) XO ZO NX NTHETA NCON NPR
1.4140 2.0000 20.0000 -1.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA - -90.000

x	.ING 1	WING 2	FU	S ELAGE	POD	1		PGD	2
			SCAP -	0.000000	SCAP =	0.000000	SCAP		0.000000
-1.667002	0.00000	0.000000		0.000000		0.00000			0.000000
798950	0.00000	0.00000		0.000000		0.000000			.098004
.069102	0-00000	0.000000		0.000000		0.000000			.350645
.937153	0.00000	0.00000		0.00 000		0.000000			.710119
1.805205	0.00000	0.00000		0.000000		0.000000			1.129511
2.673257	0.00000	0.00000		0.00000		0.000000			1.554026
3.541309	0.000000	0.00000		0.000000		.019359			1.984788
4.409360	0.00000	2.000000		0.000000		.198070			2.365444
5.277412	0.00000	0.00000		0.000000		.50028.			2.694035
6.145464	0.00000	0.000000		0.000000		.890054			2.938528
7.013515	0.00000	0.000000		0.000000		1.316338			3.095774
7.881567	0.00000	0.000000		0.000000		1.74 242			3.180196
8.749619	0.00000	0.00000		0.000000		2.156026			3.214423
9.617670	0.000000	0.000000		0.000000		2.523439			3.220192
10.485722	0.00000	0.000000		0.000000		2.810728			3.220192
11.353774	0.00000	0.000000		0.000000		3.019320			3.220142
12.221825	0.00000	0.000000		0.006000		3.142883			3.220162
13.089877	0.00000	0.00000		0.000000		3.200287			3.220192
13.957929	0.00000	0.00000		0.000000		3.219386			3.220182
14.825980	.001595	.001226		.005498		3.220182			3.220192
15.694032	.097093	.076602		.318796		3.220182			3.220182
16.562084	.323033	.254890		.872665		3.220182			3.220192
17.430135	.653325	.423987		1.249438		3.220182			3.2201 2
18.298187	1.057922	.5504 93		1.360116		3.220182			3.220182
19.166239	1.500166	.635890		1.305105		3.220182			3.220182
20.034291	1.928958	.678170		1.365105		3.220182			3.220192
20.402342	2.306445	.677814		1.365105		3.220182			3.2201*2
21.770394	2.587873	.635105		1.365105		3.220182			3.2201*2
22.638446	2.691538	.548518		1.305105		3.220182			3.220192
23.506497	2.416369	-421368		1.365105		3.220182			3.220182
24.374549	1.671768	.251024		1.365105		3.220182			3.220192
25.2426^1	.199166	.032171		1.346300		3.220182			3.220192
26.110652	0.000000	0.00000		1.315844		3.220182			3.219386
26.978704	0.000000	J.000000		1.315844		3.220182			3.201471
27.846756	0.00000	0.00000		1.315844		3.220182			3.144645
28.714807	0.00000	0.000000		1.315844		3.220162			2.997028
29.582859	0.000000	0.00000		1.315844		3.220182			2.784012
30.450911	0.000000	0.000000		1.315844		3.220182			2.489362
31.318962	0.00000	0.00000		1.315844		3.214423			2.150039
32.187014	0.000000	(. 000000		1.315844		3.183018			1.759833
33.055066	0.00000	J.000000		1.315844		3.088722			1.322223
33.923117	0.00000	0.00000		1.315844		2.912720			.878304
34.791169	0.00000	0.00000		1.315844		2.661616			.483164
35.659221	0.000000	0.000000		1.315844		2.341531			.195217
36.527272	0.000000	0.000000		1.315844		1.988734			.018639
37.395324	0.00000	0.000000		1.315844		1.567720			0.000000
38.263376	0.000000	0.00000		1.315844		1.124204			0.000000
39.131428	0.00000	0.00000		1.315844		.688216			0.000000
39.999479	0.00000	0.000000		1.315844		.345168			0.000000
40.867531	0.00000	0.000000		1.315844		.094359			0.00000
41.735583	0.00000	0.000000		1.315844		0.00000			0.000000

TABLE IV .- Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 3
MACM NO. ALPHA(DEG) XD 2D NX NTHETA NCON MPR
1.4149 2.0000 70.0000 -1.0000 50 16 0 7

S(X) FOR EACH COMPONENT AT THETA - -90.000

	3(A) 1 UK EACH CONFORT AT 11/CTA = 700000							
x	RIGHT CANARD	LEFT CANARD	BRACE	TOTAL AREA				
-1.667002	0.000000	0.000000	0.00000	0.000000				
798950	0.00000	0.00000	0.00000	- 098034				
.069105	0.000000	0.00000	0.630000	. 350645				
.937153	0.000000	0.00000	0.00000	.710119				
1.005205	0-0,-300	0.00000	0.00000	1.129511				
2.673257	0.000063	.016539	0.000000	1.572565				
3.541309	0.000000	.060632	0.00000	2.064779				
4.409360	0.000000	0.000005	0.000000	2.563514				
5.277412	0.00000	0.00000	0.00000	3.194316				
6.145464	0.00000	0.00000	0.00000	3.828582				
7.013515	.001903	0.00000	0.00000	4.414015				
7.881567	.089211	0.00000	0.00000	5.017638				
8.749619	.047565	0.00000	0.00000	5.418015				
9.617670	0.00000	0.00000	0.00000	5.743622				
10.485722	0.00000	0.00000	0.00000	6.030911				
11.353774	3.00000	0.00000	0.00000	o <i>-2</i> 39503				
12.221825	0.00000	0.00000	0.00000	6.363065				
13.039377	0.000000	0.000000	0.00000	6.420469				
13.957929	0.200000	0.00000	0.00000	6.439569				
14.825980	0.00000	0.00000	0.00000	U.448683				
15.694032	0.00000	0.600000	0.030003	6.932856				
16.562084	0.00000	0.00000	0.00000	7.890953				
17-430135	0.000^00	0.00000	0.000000	8.767115				
18.298187	0.00000	0.00000	0.00000	9.408895				
19.166239	0.00000	0.00000	0.000000	9.941525				
20.034291	0.00000	0.000000	0.000000	10.412598				
20.902342	u.000000	0.00000	0.00000	10.789729				
21.770394	0.00000	0.00000	0.00000	11.028378				
22.638446	0.00000	0.00000	0.00000	11.045326				
23.506497	0.00000	0.00000	0.000000	10.643227				
24.374549	0.200000	0.00000	0.000000	9.728261				
25.242601	0.000000	0.00000	0.000000	8.016001				
26.110652	0.000000	0.00000	0.00000	7.755413				
26.978704	0.000000	0.00000	0.00000	7.7. 197				
27.846756	0.00000	0.00000	0.00000	7.68.171				
28.714807	0.000000	0.000000	1.562540	9.095594				
29.582859	0.000000	0.00000	1.133060	8.453099				
30.450911	`- 000000	0.00000	0.000000	7.025089				
31.318962	0.000000	0.00000	0-000000	6.680306				
32.187014	0.00000	0.000000	0.000000	6.258696				
33.055066	0.000000	0.00000	0.000000	5.726789				
33.923117 34.791169	0.000000	0.00000 0.00000	` 00 0000 0. 00 0000	5.106868 4.460624				
35.659221 36.527272	0.00000	0.00000	0.000000	3.852586 3.323217				
27.395324	0.00000	0.00000	0.00000	2.883564				
38.263376	0.00000	0.00000	0.00000	2.440048				
39.131428	0.00000	0.00000	0.00000	2.004060				
39.999479	0.00000	0.00000	0.00000	1.661012				
40.867531	0.00000	0.00000	0.000000	1.410203				
41.735583	0.00000	0.00000	0.000000	1.315844				
44.133343	V. 000000	0.00000	0.00000	1.313044				



TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 3
MACH NO. ALPIAIDEG) XO ZO NX NTHETA NCON NPR
1.4140 2.0000 20.0000 -1.0000 50 16 0 8

S(X) FOR EACH COMPONENT AT THETA . 90.000

		3113	Carr Circuit in						
x	WING 1	AIME 5	FUS	ELAGE	P00	1		POD	2
			SCAP -	0.00000	SCAP -	0.00000	SCAP	•	0.00000
-3.235787	0.00000	ംഡം		0.000000		0.00000			0.00000
-2.304935	0.000000	0.00000		0.000000		0.00000			.090012
-1.374083	0.000000	0.00000		0.000000		0.00000			.322467
443231	0.00000	0.00000		0.000000		0.00000			.660614
.487621	0.00000	0.00000		0.00000		0.00000			1.042157
1.418472	0.00000	0.00000		0.000000		0.000000			1.450856
2.349324	J. 020000	0.06000		0.00000		.017780			1.841453
3.280176	0.00000	0.00000		0.000000		.182686			2.209951
4.211028	0.00000	0.00000		0.00000		.459827			2.513237
5.141880	0.00000	0.00000		0.000000		.826748			2.743591
6.072731	0.00000	0.00000		0.000000		1.227463			2.831949
7.G03583	0.00000	J.000000		0.00000		1.626076			2.9737?9
7.934435	0.00000	0.00000		0.000000		2.010919			2.9983?3
8.865287	0.00000	0.00000		0.000000		2.360169			3.002913
9.796139	0.00000	0.00000		0.000000		2.623841			3.002932
10.726990	0.00000	0.00000		0.000000		2.821863			3.002972
11.657842	0.00000	0.00000		0.000000		2.936985			3.002932
12.588694	0.000000	0.00000		0.000000		2.986959			3.002732
13.519546	0.00000	0.00000		0.000000		3.002561			3.002932
14.450396	.001486	.001142		.004911		3.002932			3.002932
15.381249	.090480	.071379		.291673		3.002932			3.002932
16.312101	.301104	.237569		.812814		3.002932			3.002932
17.242953	.609065	.395283		1.167732		3.002932			3 002932
18.173805	.986353	.513333		1.267929		3.002932			3.002932
19.104657	1.398747	.593124		1.273000		3.002932			3.002932
20.035508	1.798935	.632578		1.273008		3.002932			3.002932
20.966360	2.151353	.632223		1.273008		3.002932			3.002977
21.897212	2.413865	.592443		1.273008		3.002932			3.002932
22.828064	2.510075	.>11583		1.273008		3.002932			3.002932
23.758916	2.263085	.392461		1.273008		3.002932			3.00293 <i>2</i>
24.689768	1.520945	.233912		1.273008		3.002932			3.002937
25.620619	.179982	.029971		1.288600		3.002932			3.002932
26.551471	0.00000	0.00000		1.315844		3.002932			3.002541
27.482323	0.000000	0.000000		1.315844		3.002932			2.986959
26.413175	0.00000	0.00000		1.315844		3.002932			2.442329
29.344027	0.00000	0.000000		1.315844		3.002932			2.800599
30.274878	0.000000	0.00000		1.315844		3.002932			2.58985 -
31.205730	0.00000	0.00000		1.315844		3.002913			2.327495
32.136582	0.00000	0.00000		1.315844		Z.998323			2.010773
33.067434	0.00000	0.00000		1.315844		2.973865			1.637022
33.998286	0.00000	0.00000		1.3158		2.888838			1.239645
34.929137	0.00000	0.00000		1.31584~		2.714761			.806190
35.859989	0.00000	3.00000		1.315844		2.473424			.444053
36.790841	0.00000	0.00000		1.315844		2.192682			.180117
37.721693	0.00000	0.000000		1.315844		1.652837			.017127
30.652545	0.000000	0.60000		1.315844		1.464891			0.000000
39.583396	0.00000	0.00000		1.315844		1.047774			0.000000
40.514248	0.00000	0.00000		1.315844		.632011			0.000000
41.445100	0.00000	0.00000		1.31>844		.317508			0.000000
42.375952	0.000000	0.00000		1.315844		.086703			0.000000
43.306804	0.00000	0.00000		1.315844		0.000000			0.000000



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TABLE IV. - Continued

NONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 3

MACH NO. ALPHA(DEG) XD ZD NX NTHETA NCOM NPR
1.4140 2.0000 20.0000 -1.0000 50 16 0 8

		- 00		
4	RIGHT CANARD	LEFT CAMARD	BRACE	TOTAL AREA
-3.235787	0.00000	0.00000	0.00000	0.000000
-2.304935	0.00000	0.000000	0.000000	.090012
-1.374063	0.00000	0.00000	0.00000	.322467
443231	0.00000	J.00000	0.000000	.660614
.487621	0.00000	0.00000	0.000000	1.042157
1.418472	0.00000	.017163	0.00000	1.468019
2.349324	0.00000	.054314	0.00000	1.413547
3.280176	0.00000	0.00000	0.00000	2.392637
4.211028	0.00000	0.00000	0.000000	2.973064
5.141880	0.00000	0.000000	0.00000	3.570339
6.072731	.001781	0.00000	0.00000	4.121193
7.003583	.045383	0.00000	0.00000	4.645188
7.934435	.044491	0.00000	0.030000	5.053733
8.865287	0.00000	0.00000	0.000000	5.363082
9.796139	0.000000 0.000000	0.00000	0.030000 0.00000	5.626774 5.824815
10.726990	0.00000	0.000000	0.00000	5.939917
11.657842 12.588694	0.00000	0.00000	0.00000	5.989891
13.519546	0.00000	0.00000	0.00000	6.005493
14.450398	0.00000	0.00000	0.00000	6.013403
15.381249	0.00000	9.00000	0.000000	6.459396
16.312101	0.00000	0.000000	0.000000	7.357351
17.242953	0.00000	0.00000	0.000000	6.177945
18.173805	0.00000	0.00000	0.000000	8.773480
19.104657	0.00000	0.00000	0.00000	9.270743
20.035508	0.00000	0.000000	0.00000	9.710385
20.966360	0.000000	0.000000	0.000000	10.062448
21.897212	0.000000	0.000000	0.000000	10.285181
22.828064	0.000000	0.000000	0.000000	10.300530
23.758716	0.000000	0.000000	0.00000	9.934818
24.689768	0.000000	0.00000	0.000000	9.033730
25.620619	0.00000	0.00000	0.00000	7.504417
26.551471	0.00000	0.00000	0.000000	7.321337
27.482323	0.00000	0.00000	0.00000	7.305735
28.413175	0.00000	3.000 000	0.00000	7.261105
29.344027	0.00000	0.006000	1.533961	8.653336
30.274878	0.000000	0.00000	1.098697	8.007330
31.205730	0.00000	0.00000	0.00000	6.646252
32.136592	0.000000	0.00000	0.00000	6.324900
33.367434	0.000000	0.000000	0.00000	5.926731
33.998286	0.00000	0.00000	0.00000	5.444327
34.929137	0.00000	0.00000	0.00000	4.836805
35.859989	0.00000	0.000000	0.00000	4.233320
36.790841	0.00000	0.000000	0.000000	3. 588642
37.721693	0.000000	0.000000	0.000000	3.185807
38.652545	0.000000	0.000300	0.000000	2.780735
39.583396	0.000000	0.000000	0.00000	2.363618
40.514248	0.000000	0.000000	0.000000	1.947855
41.445100	0.000000	0.000000	0.00000	1.633352
42.375952	0.000000	0.00000	0.000000	1.402547
43.306804	0.00000	0.00000	0.00000	1.315844

TABLE IV .- Continued

NUNSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 3

MACH NO. ALPHA(DEG) XO ZO NX NTHETA NCOM NPR
1.4140 2.0000 20.0000 -1.0000 50 16 0 8

S(x) FOR EACH COMPONENT AT THETA - 270.000

x	WING 1	WING 2	FU	SELAGE	POD	1		POD	2
			SCAP .	0.000000	SCAP -	0.000000	SCAP	•	0.000010
-1.667002	0.00000	0.00000		0.000000		0.000000			0.000000
798950	0.00000	0.00000		0.00000		0.000000			.098074
.069102	0.00000	0.00000		0.00000		0.000000			. 350645
.937153	0.00000	0.00000		0.00000		0.000000			.710119
1.805205	0.00000	0.00000		0.000000		0.000000			1.129511
2.67325?	0.00000	0.00000		0.00000		0.000000			1.554076
3.541309	0.00000	0.000000		0.000000		.019359			1.984748
4.409360	0.00000	0.00000		0.00000		.198070			2.365444
5.277412	0.00000	0.00000		0.000000		.50C281			2.694035
6.145464	0.00000	0.00000		0.000000		.890054			2.938578
7.013515	0.00000	0.00000		0.000000		1.316338			3.095774
7.881567	0.00000	0.00000		0.000000		1.748242			3.160146
8.749619	0.00000	0.00000		0.030000		2.156026			3.214473
9.617670	0.00000	3.000000		0.000000		2.523439			3.220147
10.485722	0.00000	0.000000		0.000000		2.810728			3.220147
11.353774	0.000000	0.00000		0.000000		3.019320			3.2201*2
12.221625	0.00000	0.000000		0.000000		3.142883			3.2201 72
13.089877	0.00000	0.000000		0.000000		3.200287			3.220142
13.957929 14.825980	0.00000	0.00000		0.030000		3.219386			3.220182
15.694032	- 001595	.001226		.005498		3.220182			3.220142
16.562084	.097093	.076602		-318796		3.220182			3.220182
17.430135	. 323033	.254890		.872665		3.220162			3 3187
16.298187	.653325	.423987		1.249438		3.220182			-201#2
19.166239	1.057922	.550493		1.360116		3.220182			.2019?
20.034291	1.500166 1.926958	.635890		1.365105		3.226162			3.220192
20.902342		.678170		1.365105		3.220182			3.220192
21.770394	2.306445	.677814		1.365105		3.220182			3.220182
22.638446	2.587803 2.691338	.635105		1.365105		3.220182			3.220152
23.506497	2.416389	.548518 .421368		1.365105		3.220182			3.220192
24.374549	1.671768	.251024		1.365105 1.365105		3.220182			3.220197
25.242601	.199166	.032171				3.220182			3.220142
26.110652	0.00000	0.00000		1.346300		3.220182			3.220182
26.978704	0.00000	0.00000		1.315844		3.220182			3.219396
27.846756	0.200000	0.000300		1.315844		3.220162			3.201471
28.714807	0.000000	0.00000		1.315844 1.315844		3.220182 3.220182			3.144645 2.997028
29.582859	0.000000	0.00000		1.315844		3.220182			
30.420911	0.000000	0.00000		1.315844		3.220182			2.784012
31.318962	0.00000	3.000000		1.315844		3.214423			2.150039
32.187014	0.00000	0.00000		1.315844		3.183018			1.759833
33.055066	0.00000	0.00000		1.315844		3.088722			
33.923117	0.000000	0.00000		1.315844		2.912720			1.322223
34.791169	0.000000	0.00000		1.315844		2.661616			
32.659221	0.00000	0.00000		1.315844		2.341531			.483164 .195212
36.527272	0.00000	0.000000		1.315844		1.988734			.018639
37.395324	0.00000	0.000000		1.315844		1.567720			0.000000
38.263376	0.000000	0.00000		1.315844		1.124204			0.000000
39.131428	0.000000	0.00000		1.315844		.688216			0.000000
39.999479	0.000000	0.000000		1.315844		.345168			0.000000
40.867531	0.000000	0.00000		1.315844		.094359			0.000000
41.735583	0.000000	0.00000		1.315844		0.000000			0.000000

TABLE IV .- Continued

MONSYMMETRICAL TWIN BODY GEOMETRY SAMPLE

CASE CHECK 3

MACH NO. ALPHA (DEG) XU ZO NX NTHETA NCON NPR
1.7140 Z.0000 Z0.0000 ~1.0000 50 16 0 8

SIX) FOR EACH COMPONENT AT THETA . 270.000

	2(X) POR EACH COMPUNENT AT THE A - 270.300							
x	RIGHT CANARD	LEFT CAMAND	BKACE	TOTAL AREA				
-1.667002	0.000000	0.00000	c.000000	0.00000				
798950	0.00000	0.00000	0.600063	.098004				
.069102	7.000000	0.00000	0.00000	. 350645				
.937153	0.000000	0.000000	0.00000 ა	.710119				
1.805205	0.00000	0.00000	0.00000	1.129511				
2.673257	0.00000	.018539	0.00000	1.572565				
3.541309	0.00000	.060632	0.00000	2.064779				
4.409360	0.000000	3.0000G	0.00000	2.563514				
5.277412	0.00000	0.00000	0.000000	3.194316				
6.145464	0.00000	0.00000	0.00000	3.828582				
7.013515	.001903	0.00000	0.00000	4.414015				
7.881567	.089211	0.00000	0.00000	5.017638				
8.749519	.047565	0.00000	0.00000	5.418015				
4.617670	0.00000	0.00000	0.030003	5.743622				
10.485722	0.00000	0.00000	0.000000	6.030911				
11.353774	0.00000	0.00000	0.000000	6.239503				
12.221825	0.00000	0.00000	0.00000	6.363065				
13.089877	0.000000	0.00000	0.00000	6.420469				
13.957929	0.00000	J60300	0.00000	6.439569				
14.825980	0.00000	0.00000	0.00000	6.448683				
15.694032	0.00000	0.00000	0.00000	6.932856				
16.562084	0.00000	0.00000	0.000000	7.890953				
17.430135	0.00000	3.000300	0.000000	8.767115				
16.298187	0.00000	0.00000	0.000000	9.408895				
19.100239	0.00000	0.00000	0.00000	9.941525				
20.034291	0.00000	0.00000	0.000000	10.412598				
20.902342	0.00000	0.00000	0.200000	10.789729				
21.770394	0.00000	0.000300	0.00000	11.028378				
22.638446	0.000000	0.00000	0.000000	41.045326				
23.506497	0.00000	0.00000	6.00000	10.643227				
24.374549	0.000000	0.00000	0.000000	9.726261				
25.242601	0.00000	0.00000	0.000000	8.018001				
26.110652	0.000000	0.030000	0.000000	7.755413				
26.978704	0.00000	0.000000	0.000000	7.737497				
27.846756	0.000000	0.00000	0.000000	7.686671 9.095594				
28.714807	0.000000	0.000000	1.562540	8.453049				
29.582859	0.000000	3.000030	1.133060	7.025089				
30.450911	0.000000	0.00000	0.00000	6.680306				
31.318962	0.000000	0.000000		6.258696				
32.187014	0.00000	0.000000	0.000000	5.726789				
33.055066	0.000000	0.00000	0.000000	5.106668				
33.923117	0.00000	0.000000	0.000000	4.460624				
34.791169	0.00000	0.00000	0.00000	3.852586				
35.659221 36.527272	0.00000	0.00000	3.000009	3.323217				
37.395324	0.00000	0.00000	0.00000	2.883564				
38.263376	0.00000	0.00000	0.000000	2.440048				
39.131428	0.00000	0.00000	0.000000	2.004060				
39.999479	0.00000	3.000000	0.000000	1.661012				
40.867531	0.00000	3.000000	0.000000	1.410203				
41.735533	0.000000	0.00000	0.00000	1.315844				
! 37773	V. VVVVV	V. V	*****					

(1)

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TABLE IV.- Concluded

NONSYMETRICAL TWIN BODY GEOMETRY SAMPLE

	8
D/Q ASSUCIATED WITH VARIOUS OF THETA	
N THETA D/O	
0 -90.000 8.94298	
1 -67.500 4.74100	
2 -45.000 2.72934 3 -22.500 1.90443	
3 -22.500 1.90443	
4 0.000 1.82910	
5 22.500 1.73194	
6 45.000 2.45239	
6 45.000 2.45239 7 67.500 4.28751	
8 90.000 7.04826	
9 112.500 4.20001	
10 135.000 1.99596	
11 157.500 1.10849	
12 180.000 1.16545	
13 202.500 1.20999	
14 225.000 2.16458	
15 247.500 4.57042	
16 270.000 9.94298	

D/0 - 3.16119 - .31611945E+01

.01429 = .14289822E-01

EXIT OUT

SUCCESS STOP REACHED.





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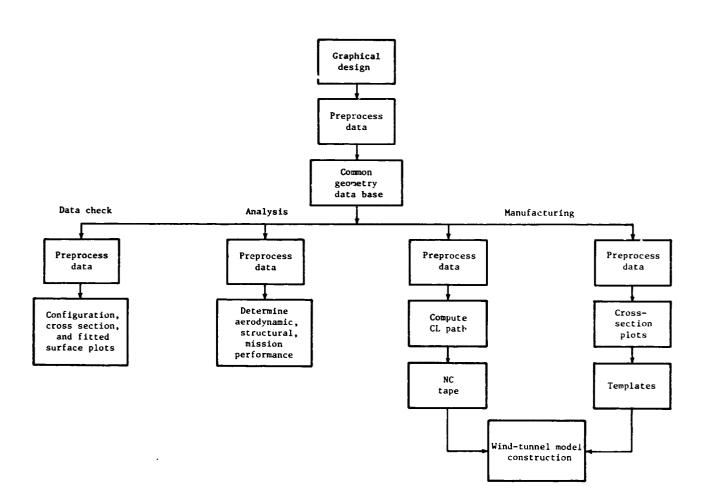
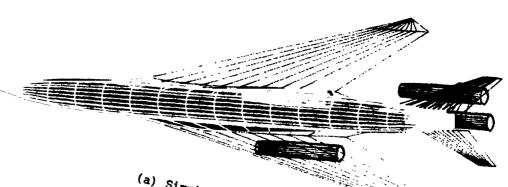
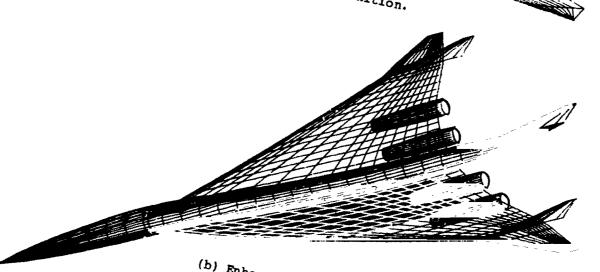


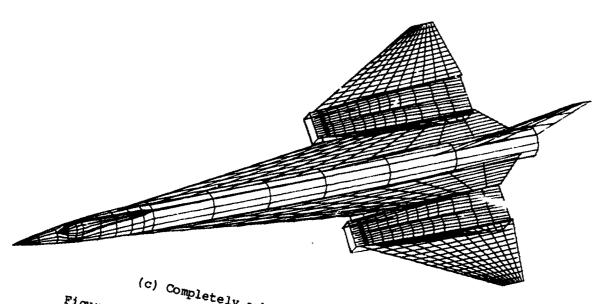
Figure 1.- Design process.



(a) Simple definition.

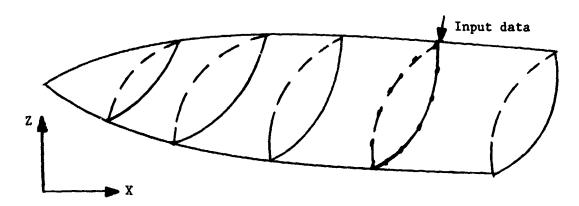


(b) Enhanced definition.

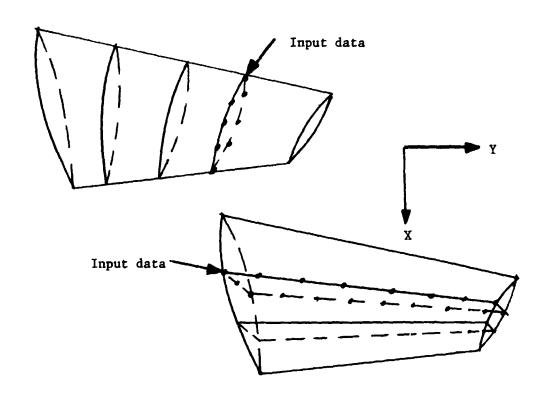


(c) Completely arbitrary definition.

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(a) Fusiform type contours.



(b) Nonfusiform type contours.

Figure 3.- Acceptable forms for component input geometry.



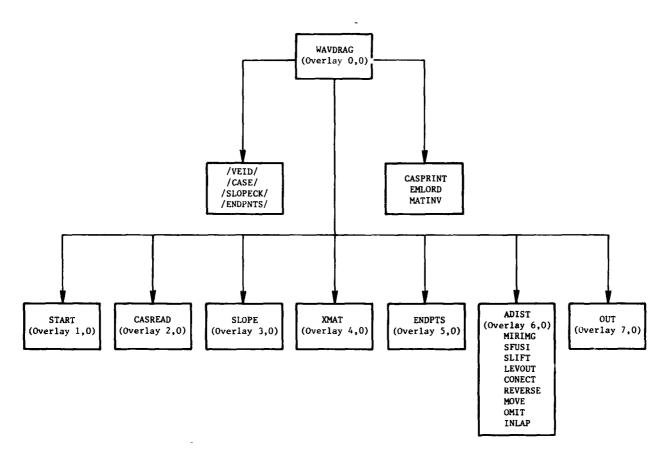
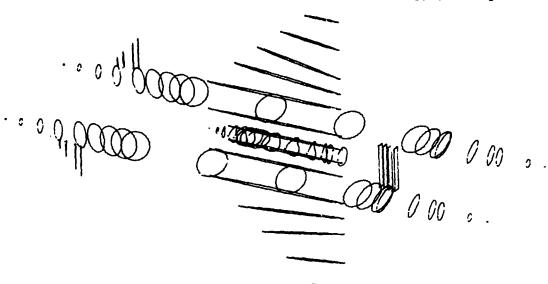


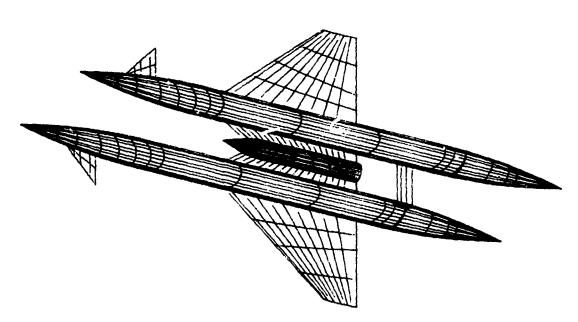
Figure 4.- Program structure.



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(a) Input contours.



(b) Input contours with corresponding points on adjoining contours connected and hidden lines removed.

Figure 5.- Sample case input configuration.